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THE TREATMENT OF SEPTICEMIA

RESULTS BEFORE AND SINCE THE ADVENT OF SULFAMIDO COMPOUNDS

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We feel that enough time has elapsed since the introduction of sulfamido compounds for some evidence to have accumulated as to the merits of these compounds in the treatment of septicemia. By septicemia is understood "a morbid condition which is due to the presence of pathogenic bacteria in the blood stream with the symptoms which are associated with this clinical syndrome."

In 1938 E. C. Rosenow Jr. with one of us [1] reviewed the cases of septicemia which had been encountered at the Mayo Clinic over a period of three years, 1934 through 1936. During that time none of the sulfamido compounds were being used by us in the treatment of septicemia. The review of 1938 offered a control group of results which can be compared with results from the use of sulfamido preparations. Accordingly, from 1937 to 1939 inclusive, when sulfamido compounds were available, we collected a group of cases comparable to those collected in the period of three years from 1934 to 1936 (table 1). The slightly larger number of cases in the later series paraliels the contemporaneous greater number of registrations at the clinic.

INCLUSIONS AND EXCLUSIONS

All cases of septicemia (positive blood culture) encountered in the period 1937 to 1939 inclusive numbered 265 (table 1). Of these, ninety-one were cases of subacute bacterial endocarditis. This is a larger number of cases of subacute bacterial endocarditis than would be expected, judging from the number of similar cases encountered in the previous period. The increase probably is explainable on the basis that during the latter three years more cases than before were referred for an attempt at chemotherapy. However, at present we cannot report a single case in which sulfamido therapy has brought about cure of subacute bacterial endocarditis. These cases represent a clinical entity differing distinctly from true septicemia. For this reason they were excluded from the study of septicemia published in 1938 and they will be excluded henceforward from the present consideration.

From the Division of Medicine, the Mayo Clinic.
Read before the joint meeting of the Section on Practice of Medicine and the Section on Pharmacology and Therapeutics at the Ninety-First Annual Session of the American Medical Association, New York, June 14, 1940.

1. Rosenow, E. C., Jr., and Brown, A. E.: Septicemia: A Review of Cases, 1934-1936 Inclusive, Proc. Staff Meet., Mayo Clin. **13**:89-93 (Feb. 9) 1938.

With the cases of subacute bacterial endocarditis excluded, we had left for consideration 174 cases of septicemia caused by a variety of micro-organisms. Of these cases we excluded nineteen, representing six micro-organisms, because the number of cases corresponding with each of the micro-organisms concerned was too small to permit significant conclusions as to the results of chemotherapy. For the same reason a comparable miscellaneous group of twenty-five cases had been excluded from the study published in 1938.

Thus there now remained for our study 155 cases. Before we take up these cases, however, we have a few comments to make on some of the nineteen excluded cases. In this excluded group appear eight cases of infection with micro-organisms of the genus Bacteroides, which still carries, in our hands, a mortality rate of 100 per cent. Two cases of septicemia due to Klebsiella pneumoniae are mentioned primarily because of their rarity; both patients died in spite of what might be considered adequate chemotherapy. In one case of rat-bite fever (Haverhill fever) Streptobacillus moniliformis was obtained from the blood stream; the patient recovered.

Turning again to the 155 cases remaining for study, it is seen (table 1) that they consisted of cases in which the infecting micro-organism was a hemolytic streptococcus, Streptococcus mitior (Streptococcus viridans), Staphylococcus aureus, Diplococcus pneumoniae (pneumococcus) or Escherichia coli (colon bacillus). These 155 cases we separated into two groups. In the first of these two groups we included those cases in which sulfamido drugs were employed. In the second group were included those cases in which sulfamido drugs, although available, were not employed. These cases of the second group were encountered in 1937 and early 1938, before the drugs had proved themselves to the satisfaction of all clinicians; if the cases had been encountered later in the period, it is safe to say that sulfamido therapy would have been applied. In the first group were 103 cases; in the second, fifty-two cases.

Thus, for comparison with our 103 cases in which sulfamido compounds were employed we had two control groups in which sulfamido drugs were not used. One of these control groups was derived from the report of 1938, which, as has been said, included cases encountered from 1934 to 1936 inclusive; the other was derived from our own series and therefore had the advantage, from the scientific point of view, of being concurrent with the cases in which sulfamido drugs were employed.

GENERAL RESULTS

In table 2 is shown a comparison of the series in which treatment was employed, with the two control series, as well as an analysis according to the infecting organism. There is no need to record here in the text

the quantities which, recorded in the table, so clearly show the comparatively favorable rate of recovery when sulfamido drugs were used. By recovery we mean that the blood cultures became negative and the patients were entirely without evidence of infection of the blood stream. It is conservative, we think, to estimate that this form of therapy for septicemia has almost doubled the rates of recovery.

TABLE 1.—*Septicemia (Positive Blood Culture), Total Series of 469 Cases, 1934-1939*

Organism Identified	1937-1939 Number	1934-1936 Number
Hemolytic streptococcus	46	61
Streptococcus mitior (not causing subacute endocarditis)	14	2
Staphylococcus aureus	44	29
Diplococcus pneumoniae	23	20
Escherichia coli	28	7
Bacteroides	8	6
Neisseria intracellularis	3	4
Staphylococcus albus	0	1
Klebsiella pneumoniae	2	0
Aerogenes	4	2
	19	25
Proteus ammoniae	0	1
Bacillus influenzae	0	1
Pseudomonas	1	0
Streptobacillus moniliformis	1	0
Small gram-negative (unclassified)	0	10
Total	174	144
Subacute bacterial endocarditis	91	60
Grand total	265	204

Examining the results on the basis of the different organisms, we find that the greatest evidence of improvement was in the cases of infection with hemolytic streptococci and Staphylococcus aureus. Patients suffering from infection with Escherichia coli were considerably benefited with treatment, although other substances, such as mandelic acid and related preparations, gave fairly good results prior to the advent of sulfamido therapy. There was no marked effect of the drug in improving an already rather high rate of recovery from infection with Streptococcus mitior (Streptococcus viridans). The results with Diplococcus pneumoniae indicate no improvement from use of sulfamido compounds and we can do nothing more in this small series than to report our experience. Here, however, results were quite different when sodium sulfapyridine for intravenous administration was introduced by Marshall and Long [2] in 1939. With regard to the fifteen cases of infection with Diplococcus pneumoniae in which treatment was by sulfamido drugs and only three patients recovered, it should be noted that in our cases of pneumococcic septicemia the infection was overwhelming and the patients often were seen late in the course of their illness or in its terminal stages. We do not, therefore, offer an example of what might be expected in the presence of pneumococcic septicemia of less severity or if treatment was possible early in the disease. We shall continue to use the preparations in these cases because there is every reason to believe that we may accomplish some good; we can only wait until we have a larger series before we can speak conclusively.

As has been said, sulfamido preparations were in use at the Mayo Clinic throughout the period of three years 1937 to 1939. However, in the first two of these years, methods of administration of the drugs, selection of the best drug to use under existing circumstances, dosages, the proper concentration in the blood stream and our organization for this form of therapy were in their developmental period. Naturally, therefore, some of the patients had what we would call, at the moment, inadequate treatment; others, fairly satisfactory treatment, and the patients recently treated (1939) what we would call, at the moment, well controlled and adequate treatment. The consequent difference in results in the first two years of the period, as compared with results in the third and last year, are shown in table 3. When attention is directed to infection with hemolytic streptococci or Staphylococcus aureus, it is evident that results were at least 10 per cent better in 1939 than they were in the previous two years. The improved results in treatment of infection with Staphylococcus aureus are attributable to the advent of sulfapyridine, which is superior to sulfanilamide in the treatment of infections due to this organism. The other three micro-organisms named in the table were represented by small numbers of cases and this may account for the statistical results relative to these organisms. The over-all picture given by table 3 represents a 6 per cent improvement in results for 1939 as compared with the previous two years.

RESULTS IN THE LIGHT OF PARTICULAR FACTORS

Age.—Age previously has been reported to be of great prognostic importance in cases of septicemia caused by hemolytic streptococci as well as in cases attributable to staphylococci. Table 4 deals with the factor of age in hemolytic streptococcus septicemia. In this table results obtained in the present series, in which sulfamido drugs were used, are compared with results in the former series, in which sulfamido drugs were not employed. As age increased there was a rather marked decrease in the rate of recovery when sulfamido preparations were not available. That is, a person past the age of 50 years who became a victim of hemolytic streptococcus septicemia had only nine chances out of 100 to recover. In the present series, all ages considered, is seen more than a doubling of the recovery rate resulting from treatment with sulfamido compounds. However, among persons more than 50 years of age, on the basis of our experience, the recovery rate has been increased sixfold. This means that the greatest improvement occurred in those ages in which the mortality was previously highest.

TABLE 2.—*Sulfamido Treatment for Septicemia: Comparison of Results in Cases With and Without Treatment*

Organism	Sulfamido Drugs 1937-1939 Total	Sulfamido Drugs 1937-1939 Recovered No.	Sulfamido Drugs 1937-1939 Recovered Per Cent	No Sulfamido Drugs 1937-1939 Total	No Sulfamido Drugs 1937-1939 Recovered No.	No Sulfamido Drugs 1937-1939 Recovered Per Cent	No Sulfamido Drugs 1934-1936 Total	No Sulfamido Drugs 1934-1936 Recovered No.	No Sulfamido Drugs 1934-1936 Recovered Per Cent
Hemolytic streptococcus	38	25	65.8	8	1	12.5	61	18	29.5
Streptococcus mitior	9	7	77.8	5	4	80.0	2	1	50.0
Staphylococcus aureus	27	15	55.6	17	2	11.8	29	10	34.5
Diplococcus pneumoniae	15	3	20.0	8	3	37.5	20	6	30.0
Escherichia coli	14	11	78.6	14	9	64.3	7	4	57.1
Total	103	61	59.2	52	19	36.5	119	39	32.8

A similar analysis of the cases in which septicemia was caused by Staphylococcus aureus was made. This showed also that the greatest amount of improvement in the recovery rate occurred among people of the older ages (more than 50 years); nevertheless, this improvement was not as marked as in cases of streptococcic

2. Marshall, E. K., Jr., and Long, P. H.: The Intravenous Use of Sodium Sulfapyridine, J. A. M. A. 113: 1671-1675 (April 29) 1939.

septicemia. It should be added, however, that effective chemotherapeutic agents for treatment of Staphylococcus aureus infection have not been available very long.

Number of Colonies Per Cubic Centimeter; Initial Blood Culture.—Previous experience has taught that colony counts in septicemia are a rather reliable prognostic indicator, especially if the cultures reveal more than 100 colonies per cubic centimeter of blood. For example, Rosenow and Brown reported that, among patients who had streptococcic septicemia and whose blood yielded, on culture, more than 100 colonies per cubic centimeter, the mortality was 83 per cent. Of those who had staphylococcic septicemia and whose blood cultures yielded a similar number of colonies, 90 per cent died. In the group in which the colonies of staphylococci numbered from 10 to 25 per cubic centimeter, a 50 per cent mortality resulted. In our study of association of colony counts with rates of recovery, we grouped together the patients with hemolytic streptococcus and Staphylococcus aureus infection (table 5). This table shows that, when sulfamido compounds are used in treatment, colony counts lose much of their prognostic significance. Approximately a 60 per cent recovery rate was experienced irrespective of the colony count.

TABLE 3.—*Sulfamido Therapy for Septicemia, Results of 1937-1938 Compared with Results of 1939*

Organism	1939			1937-1938		
	Patients Treated	Recovered No.	Recovered Per Cent	Patients Treated	Recovered No.	Recovered Per Cent
Hemolytic streptococcus	21	15	71.4	17	10	58.8
Streptococcus mitior	3	2	66.7	6	5	83.3
Staphylococcus aureus	13	8	61.5	14	7	50.0
Diplococcus pneumoniae	8	2	25.0	7	1	14.3
Escherichia coli	8	6	75.0	6	5	83.3
Total	53	33	62.3	50	28	56.0

Maximal Leukocyte Count.—Another impression previously has been that if the leukocyte count is less than 10,000 per cubic millimeter of blood the prognosis is most grave. Rosenow and Brown, for example, quoted a mortality rate of 100 per cent in streptococcic septicemia and 75 per cent in staphylococcic septicemia if the maximal leukocyte count was 10,000. If the counts were between 10,000 and 30,000, the mortality rate in both groups of cases was reported to be approximately 60 to 65 per cent. From a similar analysis it appears that in cases in which sulfamido drugs have been used in treatment the prognostic significance of the leukocyte count is of questionable value. In fact, of patients whose maximal leukocyte count was 10,000 or less as many recovered as in the group of cases in which the counts were up to 20,000 per cubic millimeter; the percentages of recovery were 55.6 and 61.0 respectively. Likewise, in a group of seven cases in which the maximal leukocyte count was 30,000 or more per cubic millimeter of blood, two of seven patients (40 per cent) recovered. Another factor of significance in connection with the leukocyte count must not be overlooked, since depression of the leukocyte count to 10,000 or less is not at all an uncommon accompaniment of sulfamido therapy in association with either of these types of septicemia. For that reason we feel justified in declaring that the maximal leukocyte response is no longer of prognostic significance but, rather, that it is an observation to be made only with reference to the possible effect of sulfamido therapy itself on the hemopoietic system.

Adequate versus Inadequate Treatment.—We believe at present that the most significant feature in recovery is the adequacy of treatment. Still, we do not feel it fair to build the results of therapy entirely around this point. The reasons are clear: First, we do not wish to go on record as having arrived at what might be called completely adequate therapy; second, a tendency might exist to include all patients who recovered in the adequately treated group regardless of how much or how long they received one of the sulfamido compounds. Adequacy of treatment, to be sure, is closely followed in importance by the factor of the time which elapses between the onset of infection and the beginning of therapy. Likewise recovery, regardless of adequate treatment, is also dependent on the factor of complications; these will be dealt with separately.

We mean by adequate treatment that a patient has received one or several of the sulfamido drugs in dosages which would produce concentrations in the blood stream which we feel are indicated for treatment of septicemia and that treatment has been continued over a period sufficient to account for the clinical response. Looking at table 6, it becomes apparent that the highest recovery rate occurred in the group in which treatment could be called adequate. The table shows that a patient adequately treated has seven chances out of ten of recovering as against seven chances out of ten of dying when he is inadequately treated. We feel that this point cannot be too greatly emphasized for the sake of that small group of patients who, for one reason or another, receive inadequate treatment or are treated by persons not experienced in the management of septicemia. The development of a focus directly connected with the circulating blood, and which was ineradicable, namely, thrombophlebitis with infection or an infected heart valve, in general accounts for those patients who did not survive infection with hemolytic streptococci. It is seen in table 6 that the rate of recovery from infection with Staphylococcus aureus was approximately as high as that relative to hemolytic streptococci; this appears to be a distinct advance in therapy. Among the patients who did not survive infection with Staphylococcus aureus, complications similar to those mentioned were encountered in addition to the not infrequent multiple peripheral abscesses which occur in this type of sepsis. Streptococcus mitior (Streptococcus viridans), exclusive of those cases in which it causes subacute bacterial endocarditis, in general responds well to treatment with

TABLE 4.—*Sulfamido Therapy in Hemolytic Streptococcus Septicemia: Age Factor in Treated and Untreated Cases*

Age	Sulfamido Drugs 1937-1939			No Sulfamido Drugs 1934-1936		
	Total Patients	Recovered No.	Recovered Per Cent	Total Patients	Recovered No.	Recovered Per Cent
0 to 24	9	8	88.9	14	8	57.1
25 to 49	12	7	58.3	25	8	32.0
50 and up	17	10	58.8	22	2	9.1
Total	38	25	65.8	61	18	29.5

sulfapyridine or sulfanilamide, as do the infections caused by Escherichia coli. We previously have explained the low recovery rate in cases of septicemia from Diplococcus pneumoniae.

SELECTION OF THE DRUG AND METHOD OF ADMINISTRATION

We have used six compounds of proved clinical worth for the treatment of septicemia. These compounds are azosulfamide, sulfanilamide, sulfapyridine, the sodium salt of sulfapyridine, sulfamethylthiazole, and the sodium salt of sulfamethylthiazole. The following factors govern the selection of one of these compounds as that most suited for the infection to be treated: (1) variability of absorption and acetylization of sulfapyridine, (2) increased toxicity of sulfapyridine as compared with sulfanilamide, (3) decreased toxicity with associated decreased therapeutic effectiveness of azosulfamide as compared with sulfanilamide, and (4) variation of therapeutic effect of individual compounds in the presence of different types of organisms. Because of these factors, sulfanilamide is the best drug for infections produced by the beta hemolytic streptococcus, Neisseria gonorrhoeae, Escherichia coli, Neisseria intracellularis (meningococcus) and Clostridium welchii. Sulfapyridine is the best drug for infections produced by Diplococcus pneumoniae, Streptococcus mitior (Streptococcus viridans), Staphylococcus aureus and Klebsiella pneumoniae. Sulfamethylthiazole appears to be as effective as sulfapyridine against Diplococcus pneumoniae and Staphylococcus aureus and has the added advantage of not producing evident irritation in the gastrointestinal, renal or hemopoietic systems.[3] However, its use at the moment is inadvisable because of one significant complication: namely, lower motor neuron involvement. This complication afflicted three of nearly 150 patients treated by us for various types of infections, including six patients with Staphylococcus aureus septicemia. Sulfapyridine, because of its effect on the foregoing micro-organisms, as well as on beta hemolytic streptococci, is also the preferable drug for use in cases of septicemia of unknown cause. We believe that azosulfamide is of value in treating septicemia produced by organisms that are affected by sulfanilamide if neither sulfanilamide nor sulfapyridine is well tolerated, and we have used azosulfamide effectively in such conditions. The sodium salt of sulfapyridine is of value if sulfapyridine alone will not produce desired concentrations of drug in the blood. The same is true of the sodium salt of sulfamethylthiazole.

TABLE 5.—*Sulfamido Therapy in Hemolytic Streptococcus and Staphylococcus Aureus Infections: Significance of the Colony Count (Initial Blood Culture)*

Colonies per Cubic Centimeter	Total Patients	Recovered	
		Number	Per Cent
Less than 25	26	16	61.5
25 to 99	13	9	69.7
100 to 199	16	9	56.2
200 and more	11	7	63.6
Total	65	40	61.5

In using these various drugs in case of septicemia, it is necessary to obtain high concentrations of free drug in the blood, and the best results will be obtained if treatment is started at the earliest possible moment and at a time when foci of infection and destruction of tissue are minimal. In other words, it is essential that the initial doses immediately establish the concentration of drug desired in the blood and that subsequent doses be directed to maintaining the concentrations so established. Our experience has shown that any lowering of these concentrations before recovery has taken place will definitely prolong the course of illness and jeopardize recovery.

In using sulfanilamide, sulfapyridine or derivatives of thiazole in septicemia, in general it is advisable to obtain a concentration of 12 to 16 mg. of drug in 100 cc. of blood. We believe, however, that septicemia caused by Staphylococcus aureus presents a somewhat distinct entity in which the result will be best if the concentration of drug is kept at 16 to 20 mg. per hundred cubic centimeters of blood. In using sulfanilamide, the desired concentration of drug in the blood usually can be obtained by giving orally an initial dose of from 50 to 80 grains (3.3 to 5.2 Gm.) to patients weighing upward from 100 pounds (45 Kg.). Subsequent doses of from 15 to 20 grains (1 to 1.3 Gm.) of sulfanilamide, given orally at intervals of four hours throughout each twenty-four hours, usually will serve to maintain the levels thus established. In using sulfapyridine orally, however, it is as a rule impossible to obtain the high concentrations of drug in the blood which are desired without giving the sodium salt of sulfapyridine intravenously. As a rule, the use of from 15 to 22½ grains (1 to 1.5 Gm.) of sulfapyridine given orally at intervals of four hours throughout each twenty-four hours will produce the maximal concentration of drug in the blood that can be obtained by oral use of sulfapyridine alone. If the patient is unable to swallow, oral use of sulfapyridine may be facilitated by administering the drug suspended in milk or water through a Rehfuss tube. Our practice has been to give the sodium salt of sulfapyridine intravenously in 5 per cent solution in distilled water and, as originally suggested by Marshall and Long, we have calculated the dose on the basis of using 0.06 Gm. of drug per kilogram of body weight. It is necessary, because of the marked alkalinity of this solution (p_H about 10.7) that it be given directly into the vein and that it be given at a rate not to exceed 5 cc. per minute. At times we have given larger quantities of sodium sulfapyridine intravenously than the foregoing calculation indicates but we never have given more than

TABLE 6.—*Sulfamido Treatment for Septicemia, 1937-1939: Results of Adequate versus Inadequate Treatment*

Organisms	Treatment					
	Adequate			Inadequate		
	Total Patients	Recovered		Total Patients	Recovered	
		No.	Per Cent		No.	Per Cent
Hemolytic streptococcus	31	24	77.4	7	1	14.3
Streptococcus mitior	7	6	85.7	2	1	50.0
Staphylococcus aureus	16	12	75.0	11	3	27.3
Diplococcus pneumoniae	10	3	30.0	5	0	....
Escherichia coli	10	8	80.0	4	3	75.0
Total	74	53	71.6	29	8	27.6

3. Herrell, W. E., and Brown, A. E.: The Clinical Use of Sulfamethylthiazole in Infections Caused by Staphylococcus Aureus: Preliminary Report, Proc. Staff Meet., Mayo Clin. **14**:753-758 (Nov. 29) 1939.

5 Gm. as a single dose. The previously calculated dose, or some portion of it, may be repeated intravenously at intervals of from six to eight hours as necessary to maintain the concentration of drug desired in the blood. In some instances we have thus used the sodium salt of sulfapyridine from one to three times daily for as long as ten days when this procedure has been necessary in order to maintain the desired concentration of drug in the blood. Our experience has led us to believe that the intravenous use of sodium sulfapyridine should be considered primarily to supplement oral use of sulfapyridine when it is desired to elevate rapidly the concentration of sulfapyridine in the blood or when it is impossible to maintain this concentration by oral therapy alone. Because of this, oral administration of sulfapyridine always should be started when intravenous administration of sodium sulfapyridine is begun. In only rare instances have we used the latter drug alone.

In using azosulfamide in septicemia, it is obvious that determinations of the concentration of sulfanilamide in the blood give no accurate index of the effectiveness of treatment. Unfortunately there is no laboratory test by which one can determine whether satisfactory amounts of this drug are being given, and the only criterion is clinical response. We have given 120 grains (7.8 Gm.) daily of azosulfamide orally in divided doses in cases of septicemia and we also have supplemented this by subcutaneous or intramuscular administration of from 50 to 80 cc. daily of the 2.5 per cent solution of azosulfamide. We have used azosulfamide only if the patient was intolerant to sulfanilamide or sulfapyridine.

It is not our intention to leave the impression that we disregard other factors in the management of septicemia. Foci of infection always are surgically eliminated in our cases of septicemia when such foci can be attacked. The improvement in our results in the management of septicemia, however, cannot be attributable to surgical procedures, since such procedures differed in no way in our present series from those performed prior to the advent of sulfamido compounds.

General supportive measures, including repeated transfusions of small quantities of blood, also are employed in the management of septicemia, especially if anemia is present, but here again this is a factor in treatment which has not changed in the slightest in the past three years.

SUMMARY

Enough time has elapsed since the introduction of sulfamido compounds to justify a study of the merits of these compounds in the treatment of septicemia. After exclusion of certain cases we had left for study 155 cases of septicemia caused variously by a hemolytic streptococcus, Streptococcus mitior, Staphylococcus aureus, Diplococcus pneumoniae and Escherichia coli. Of these 155 cases we selected the 103 in which sulfamido drugs had been employed and we compared the results in these cases not only with those in the fifty-two cases of the 155 in which these drugs had not been employed but also with results in 119 similar cases encountered in 1934 to 1936 inclusive, when sulfamido drugs were not available.

It is conservative, we think, to estimate that the use of these drugs in cases of septicemia has almost doubled the recovery rates, in general, but this does not mean that results in the presence of different organisms are uniform. In any series of cases of septicemia, by far the larger proportion of the cases are caused by hemolytic streptococci and Staphylococcus aureus. Fortunately these are the two micro-organisms against which, in our experience, sulfamido drugs have proved most effective.

Prior to the advent of sulfamido therapy, three factors were of great prognostic significance in septicemia. These were the age of the patient, the colony count on initial blood culture and the maximal leukocyte count. These factors, we found, were of reduced significance when sulfamido drugs were used. Evidence to support this statement from our series is that (1) among patients more than 50 years of age the recovery rate was increased sixfold, (2) approximately as many patients recovered, whether the initial colony count was low or high, and (3) the recovery rate was not substantially affected whether the maximal leukocyte count was below or above 10,000 per cubic millimeter of blood.

Our experience indicated that in the treatment of a series of cases of septicemia caused variously by the five micro-organisms named in a previous paragraph the single factor of greatest importance was adequacy of treatment. Evidence of this is that, when adequately treated with sulfamido compounds, patients had a seven out of ten chance of recovery as against a seven out of ten chance of dying if inadequately treated. In the latter group, results were no better than if sulfamido drugs had been completely withheld.

ABSTRACT OF DISCUSSION

DR. PERRIN H. LONG, Baltimore: It is a pleasure to talk with Dr. Herrell and Dr. Brown about their experience with sulfanilamide and its derivatives. We are generally in complete agreement. They have done a real service in collecting the data at their disposal. It is time for all of us to find out what actually has happened to people who have been given these compounds during the past four years. All physicians can remember spectacular cases of meningitis, septicemia and other grave illnesses in which prompt response has occurred, but we have forgotten that there have been some cases in which recovery ought to have occurred but didn't. It is time to check up on all of our clinical data to find out what we can do to improve the results we are getting. The authors stressed an important factor, and that is the adequacy of treatment. When one is confronted with a disease that responds to treatment with these drugs, one should make up one's mind to cure it, so that enough of the drug will be given for a long enough period of time, and the chances are that the patient will do very well. As the authors pointed out, we should not forget that there are auxiliary types of treatment. Dr. Lockwood stressed that on Tuesday morning. In no instance should we depend on these drugs to do something that the knife can do much better. We must realize that patients need vitamins, they need fluids most badly when they are getting thiazole or sulfapyridine, and they need every measure of supportive treatment that we can give them. In every instance try to use every auxiliary method of treatment, because then again the cure rate in the various types of infections will go to an even higher point than exists today.

DR. WALLACE E. HERRELL, Rochester, Minn.: I failed to point out that these results are sound on the basis of available evidence and that the results have been brought about entirely as a result of sulfamido compounds. We of course attack any surgical lesion associated with the septicemia and we use all the supportive measures we used before, such as repeated transfusions. The important thing is that these measures have not changed since these compounds have been introduced, and for that reason one must conclude that the increase in recovery rates has resulted from use of these compounds. One point in Dr. Yater's discussion, both Dr. Long and I feel, should be stressed; namely, if these compounds are given early in any infection, however insignificant it may seem at the time, I am sure there will be less septicemia, and septicemia kills several thousand people a year in America.

THE MEDICAL MANAGEMENT OF FRACTURES

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The subject of delayed union and nonunion of fractures is still in a state of confusion. The orthopedic surgeon has made great strides in his department of the practice of medicine, but this progress is limited largely to the mechanical aspects of orthopedics. He has not scientifically explained the causes of delayed union or nonunion of fractures or of bone disease, especially arthritis.

The literature on factors concerned in metabolism of bone is confusing and is to a great extent confined to the study of individual elements without due regard to the relationship of all the physicochemical processes involved and their clinical interpretation and application to growth and regeneration of bone.

Some suggestions as to the medical management of fractures, based on a large number of clinical cases as well as on considerable experimental evidence, should be of interest at this time. The suggestions offered

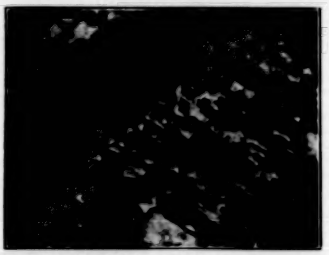

Fig. 1.—Section through the proximal end of a tibia of a normal rat (81 days old). Note the healthy appearance and regular arrangement of the cartilage cells at the zone of calcification. There is normal ossification.

here are based first on the study and management of approximately 1,000 fresh fractures treated in our clinic in the last five years without a failure in union; second, on the forced regeneration (by medical management) in several cases of fracture with greatly delayed unions, cases of osteoporosis, Paget's disease, fragilitas ossium and the like and, third, on animal experimentation.

Contrary to the generally accepted opinion as to the causes of nonunion of fractures, anything affecting the general physiology of the patient, such as endocrine imbalance, vitamin insufficiency and disturbed blood chemistry (especially the electrolytes), is potentially a causative factor in delayed union or nonunion of bone.

While it is granted that most fractures heal eventually, the medical management suggested in this paper, if properly applied, will produce rapid union in almost every case with a minimum amount of callus. This is of vast importance in the healing of fractures involving joints. Rapid union means bony union or "healing by first intention" and is not accompanied by excessive callus. Callus is osteoid tissue, and the ossification of it, or development of trabeculae in it, is a secondary process resulting in delayed union.

From the Nelson Clinic.

THE SPECIFIC FACTORS GOVERNING BONE METABOLISM

1. Calcium and phosphorus concentrations of the serum.
2. The calcium-phosphorus ratio of the serum.
3. Activity of the parathyroid gland.
4. Vitamin D levels.

In order to appreciate the vital importance of these factors and to learn to control them, one should have a clear concept of the effect of various deficiencies on osseous growth and maintenance. To assist in that direction we prepared an exhibit which was shown at the annual meeting of the American Medical Association in New York last June. This exhibit consisted of transparencies showing results obtained by selective medical management of recent fractures and of fractures with delayed union. Also there were models and prints of bones developed experimentally which showed the gross and microscopic effects of mineral deficiencies and the administration of vitamin D and solution of parathyroid on bone growth and maintenance.

Fig. 2.—Section through a femur of a rat (81 days old) fed on a low phosphorus (rickets) diet. Note the persistence of embryonal cartilage along the articular surface. The cartilage cells at the zone of calcification are unhealthy and widely separated. The bone trabeculae are separated by considerable fibrocartilage.

BLOOD CHEMISTRY

The availability of calcium and phosphorus for precipitation in the formation of bone depends partially on optimal concentration levels in the serum and on the ratio of calcium and phosphorus. Therefore, blood chemistry determinations of calcium and phosphorus levels in the serum should be made early in each case in order that accurate medical management may be instituted at once.

Fig. 3.—Section through a femur of a rat (81 days old) fed a diet relatively high in phosphorus and low in calcium. Note the almost complete absence of bone trabeculae and the marked osteoporosis. The marrow encroaches on the zone of calcification.

Our experience in the control of calcium and phosphorus metabolism in the treatment of nervous states as well as of bone problems has led us to believe that optimal levels of serum calcium are from 10.5 to 12 mg. per hundred cubic centimeters and optimal levels of serum phosphorus are from 3.5 to 4 mg.

per hundred cubic centimeters with a ratio of 3 calcium to 1 phosphorus (3 to 1). Our clinical experience has led us to believe that average variations of calcium levels of from 9 to 11 mg. and phosphorus levels of from 3 to 6 mg. per hundred cubic centimeters are not optimal levels.

In acromegalic types of bone, or in cases of osteoporosis, we recommend developing a serum calcium concentration of 12 mg. per hundred cubic centimeters and a serum phosphorus concentration of 4 mg. per hundred cubic centimeters to assure early union.

Blood chemistry determinations in approximately 1,000 fresh fracture cases revealed that 85 per cent of these patients have a low serum calcium level (below 10 mg. per hundred cubic centimeters) and 25 per cent have a low serum phosphorus level (below 3.5 mg. per hundred cubic centimeters). If accurate laboratory facilities are not available, it is justifiable in all cases of fracture to institute the medical management recommended for cases of low serum calcium.

After extensive experimental and clinical study we are convinced that the statement so frequently made that the levels of serum calcium and serum phosphorus cannot be controlled by medication and diet is erroneous.

MODIFIED CLARK TECHNIC FOR CALCIUM DETERMINATION

2 cc. of serum (fresh).
2 cc. of distilled water.
1 cc. of ammonium oxalate, saturated solution.
Mix and let stand at least four hours.
Centrifuge for from five to ten minutes
Remove supernatant fluid carefully.
Drain on filter paper.
Add 5 cc. of 2 per cent ammonia water.
Wash by centrifuge at once.
Drain and add 5 cc. of tenth normal sulfuric acid and heat to 75 C. in a water bath. Then titrate with hundredth normal potassium permanganate to the first permanent pink. The number of cubic centimeters of permanganate used equals the number of milligrams of calcium in 100 cc. of serum.

Special precautions:

1. Serum should be separated from clot as soon as possible.
2. Be sure serum contains no red blood cells.
3. Permanganate must be made fresh. Be sure titration is hundredth normal.
4. All containers must be clean and dry.

BENEDICT TECHNIC FOR PHOSPHORUS DETERMINATION

Filtrate 2 cc. of serum, 4 cc. of distilled water and 4 cc. of trichloroacetic acid.
Shake and allow to stand ten minutes. Filter.
Unknown: 3 cc. of filtrate, 5 cc. of distilled water.
Standard: 3 cc. of standard solution (0.025 mg.) of phosphorus, 5 cc. of distilled water.
Add to both tubes 1 cc. of Benedict's hydroquinone bisulfate reagent and 1 cc. of Benedict's molybdic acid reagent.
Place both tubes, loosely stoppered, in a beaker of boiling water for ten minutes. Cool and read in colorimeter.

$$\frac{RS}{RU} \times 0.025 \times \frac{100}{0.6} = \text{mg. of phosphorus in 100 cc. of serum}$$

If necessary to mail blood to a laboratory, send 10 cc. of centrifuged blood serum immediately after it is drawn (patient fasting). Send it special delivery air mail (in refrigeration).

MEDICAL MANAGEMENT

Low Calcium.—Low serum calcium may result from impaired parathyroid function, insufficient calcium intake and absorption or too much phosphorus consumption or retention. In cases of low serum calcium concentration, give at least 1 quart (liter) of milk daily. Give 1 drachm (4 Gm.) of calcium gluconate powder thoroughly dissolved in 4 or 5 ounces (from 120 to 150 cc.) of hot water one-half hour before meals daily. Do not substitute dicalcium phosphate for calcium. In cases of low serum calcium with a high serum phosphorus concentration it is important to withhold the foods with a high phosphorus content such as liver, fish, eggs, cheese, green vegetables and cereals for from ten to fourteen days until a proper ratio of calcium and phosphorus is established.

Fig. 4.—Section through a femur of a rat (81 days old) fed a diet deficient in both calcium and phosphorus but with fairly normal ratio. The zone of calcification is fairly normal in appearance but there is a delay in ossification.

In the management of simple Colles' fracture, or fracture of small bones (except carpals and tarsals), if the roentgenograms indicate fairly good bone texture it is not necessary to give calcium intravenously unless the serum calcium level is below 10 mg. per hundred cubic centimeters. To prevent "osteoporosis from disuse" in the treatment of Colles' fracture, give 1 cc. of solution of parathyroid subcutaneously every third day for from three to five doses, in addition to the calcium gluconate powder by mouth.

In all fractures of large bones, all carpal and tarsal fractures and all fracture cases complicated with osteoporosis, give calcium gluconate powder as already stated. Also give a 10 cc. ampule of 10 per cent calcium gluconate daily intravenously for ten days, then every third day until the blood chemistry determinations indicate a serum calcium of from 11 to 12 mg. per hundred cubic centimeters. Increase the calcium level to 12 mg. per hundred cubic centimeters in cases of senile osteoporosis or in acromegalic types of bones. Give 1 cc. of solution of parathyroid subcutaneously every three days until the serum calcium has reached the desired level, which usually requires from five to seven doses. Then give 1 cc. every six to seven days until the bone

Fig. 5.—Section through a femur of a rat (81 days old) fed a diet low in calcium with the addition of vitamin D. Note the short bone trabeculae and the dissemination of fat cells throughout the bone marrow. This is very significant. It demonstrates the destructive effect of vitamin D in cases of low calcium diet.

has healed. The dosage of solution of parathyroid for children from 5 to 12 years of age is 0.5 cc. and for infants ⅓ cc.

Low Phosphorus.—Low serum phosphorus may result from hyperparathyroidism, low phosphorus intake, high calcium absorption and insufficient vitamin D intake.

In cases of low serum phosphorus concentration give phosphorus-containing foods such as liver, eggs, fish, cheese, green vegetables and cereals. Give approximately 3,000 units of vitamin D daily, preferably in the form of cod liver or halibut liver oil concentrate (see paragraph on vitamin D) until the serum phosphorus concentration has reached from 3.5 to 4 mg. per hundred cubic centimeters, depending on the type of case, as explained in the previous paragraph.

Fig. 6.—Section through a femur of a rat (114 days old) fed a low phosphorus (rickets-genic) diet with vitamin D for seventy-two days. Note the marked destruction of cartilage and the limited number of trabeculae. The marrow has encroached on the preparatory zone of calcification. There are only a few islands of ossification. Many giant cells are seen. Vitamin D is not effective without a sufficient intake of phosphorus.

If the serum calcium level is 10.5 mg. per hundred cubic centimeters or above, do not give additional calcium medication until the serum calcium-phosphorus concentration ratio has reached 3 calcium to 1 phosphorus and then increase the concentration of calcium and phosphorus to the levels which seem indicated by the condition and size of the fractured bone. Do not use solution of parathyroid in cases of low serum phosphorus.

Fig. 7.—*A*, a dog's leg twenty-six days after it was fractured. The dog received a regular diet plus vitamin D. *B*, a dog's leg twenty-six days after it was fractured. The dog received a regular diet with 90 grains (6 Gm.) of calcium gluconate powder and 1 cc. of solution of parathyroid subcutaneously for five doses. Note the rapid healing as compared to *A*.

In making subsequent serum phosphorus and calcium determinations, an increase may not be manifest for ten or fifteen days after treatment has been instituted. The increase in serum calcium and serum phosphorus immediately following medication is quickly removed from the blood stream, so that there will be no permanent rise in the calcium and phosphorus levels until a certain point of tissue saturation has been established. These levels are easily controlled as soon as the relationship of solution of parathyroid to calcium metabolism and vitamin D to phosphorus metabolism is fully appreciated.

To prevent late absorption, especially of fractures of the neck of the femur, a diet assuring calcium-phosphorus balance should be continued long after healing has taken place.

THE ACTION OF SOLUTION OF PARATHYROID

The calcium regulating function of the parathyroids has been known for several years. In 1925 Collip[1] obtained an extract from beef parathyroids which produced a powerful hypercalcemic effect. The fundamental nature of the action of solution of parathyroid on serum calcium and on the mobilization of bone calcium has been the subject of much discussion. Much has been written regarding hyperparathyroidism accompanying adenoma of the parathyroids. This is characterized by a high serum calcium and low serum phosphorus level with marked bone absorption known as osteitis fibrosa cystica. This condition is rare as compared to all other bone problems. A great deal has also been published describing the effects of toxic doses of

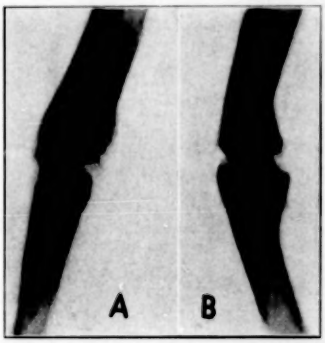

Fig. 8.—*A*, a dog's leg nine days after it was fractured. This dog was placed on a deficiency diet for three weeks previous to the fracture. Following the fracture the dog received a generous normal diet. Note the rapid healing. *B*, a dog's leg seven weeks after it was fractured. This dog was left on a deficiency diet. Note the nonunion.

solution of parathyroid on animals, especially the dog, which quite resembles a human being in its reaction to administration of solution of parathyroid.

However, clinical records as to the therapeutic effects of this drug on human beings are limited. These records pertain largely to the treatment of tetany, which is directed toward increasing the serum calcium concentration without due regard to the establishment of the calcium metabolism which will produce or maintain proper bone structure.

Toxic doses of solution of parathyroid or of vitamin D preparations, even without extra calcium medication, increase serum calcium concentration levels and will relieve tetany. They do so by releasing the calcium from the bones, and if continued too long they cause bone absorption. We concur with many others that this calcium is probably released from the trabeculae.

Impaired parathyroid function allows an increase in serum phosphorus concentration and a decrease in serum

1. Collip, J. B.: Internal Secretion of the Parathyroid Glands, in Stieglitz, Julius: Chemistry in Medicine, New York, Chemical Foundation, Inc., 1928, p. 315.

calcium concentration. This increase in phosphorus concentration may decrease the ionized calcium to the degree of producing tetany. Parathyroid medication increases the excretion of phosphorus largely through diuresis beginning in one or two hours, resulting in an early increase in calcium ions even before the increase in serum calcium concentration takes place (from eight to twelve hours). Any diuretic such as hydrochloric acid, ammonium chloride or sodium chloride assists in the excretion of phosphorus.

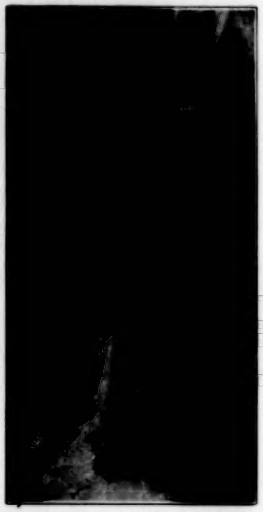

Fig. 9.—Mr. A. sustained a fracture of the middle third of the humerus in an automobile accident eleven months before coming to our clinic. The history and roentgen examination showed no improvement for five or six months. The Wassermann reaction was negative. Serum calcium was 8.8 mg. per hundred cubic centimeters and serum phosphorus 2.9 mg. at the time of the first examination. He was placed on a high calcium-low phosphorus diet, 1 drachm (4 Gm.) of calcium gluconate powder by mouth one-half hour before two meals each day, a 10 cc. ampule (10 per cent) of calcium levulinate intravenously daily for ten days, then every second day for ten doses. He was given 1 cc. of solution of parathyroid subcutaneously every third day for five doses, then once each week for five doses. After five weeks' medication, serum calcium was 11.4 mg. and serum phosphorus 3.8 mg. per hundred cubic centimeters. The urine was kept acid. The arm was not immobilized.

It has been found that one large dose (1,000 units) of solution of parathyroid given to a rat would cause many of the bone cells of the femur to change into fibroblasts in the course of twenty-four hours and to change back into bone cells again within ninety-six hours.

We have observed in dogs that a short period of demineralization resulting from deficiency diets, prior to or at the time of fracture, followed by generous feeding, produces rapid healing. Deficiency diets continued for from six to seven weeks after fracture resulted in nonunion.

In man, a 1 cc. dose of solution of parathyroid given by hypodermic injection mobilizes calcium from the trabeculae for a few hours after administration. This is followed by rapid osteoblastic activity if sufficient serum calcium and serum phosphorus are available. We recommend the administration of 1 cc. of solution of parathyroid every third day for from three to five doses, then every seven days for five or more doses, according to the type of bone under management, as advised in the paragraph on medication for low calcium levels.

Our observations of the effect of therapeutic doses of solution of parathyroid in the treatment of more than a thousand fractures and several thousand medical cases in which hypocalcemia was a factor, as well as its gross and microscopic effects on bones of experimental animals, have resulted in certain definite conclusions. Solution of parathyroid given by hypodermic injection (1) increases the excretion of phosphorus in the urine, (2) assists in the proper utilization of diffusible calcium, (3) probably makes some of the nondiffusible calcium available (more calcium ions) and (4) stimulates osteoclastic, followed by osteoblastic, activity in bone.

In cases of low serum calcium concentration there is no practical routine method of determining whether it is due to a dysfunction of the parathyroids or to an insufficient intake and absorption of calcium. We believe that in many cases all three factors are concerned. This is borne out clinically.

VITAMIN D

For centuries vitamin D in the form of cod liver oil has been used in the treatment of rickets, which is always due to a deficiency in serum phosphorus (fig. 2). Serum calcium levels may be normal, low or high. If there is a deficiency in both calcium and phosphorus, fewer pathologic changes of the bone result than in cases of phosphorus deficiency alone, as is demonstrated in figure 4.

Vitamin D increases the serum phosphorus concentration much more rapidly than the serum calcium, resulting in a short time in a low serum calcium-phosphorus concentration ratio. This may produce nonunion. The promiscuous use of vitamin D, especially viosterol, may be dangerous.

Fig. 10.—Union of the fracture sustained by Mr. A., complete eight weeks later. Patient was able to return to work.

We have shown that young rats on a calcium deficient diet with vitamin D (concentrated cod liver oil) develop marked osteoporosis. The bone is replaced by fat (fig. 5). Compere [2] has reported that vitamin D, even with extra calcium, delays union of fractures in some rats.

2. Compere, E. L.; Hamilton, B., and Dewar, M.: Influence of Vitamin D on Bone Repair: Healing of Fractures of Rachitic Bones, Surg., Gynec. & Obst. 68:878-891 (May) 1939.

Extra vitamin D above a sustaining dose of from 400 to 500 units daily should be used only in cases of low serum phosphorus concentration, which constitute not more than 25 per cent of fracture cases. Moreover, vitamin D is not effective without a sufficient intake of phosphorus-containing foods. This fact has been almost completely overlooked in the treatment of rickets and is responsible for failures even when large doses of vitamin D have been administered.

Fig. 11 (Mr. S., a miner aged 60).—The patient had sustained a fracture of both bones of a leg twenty-two months previous to coming to the clinic. There had been no improvement for many months. Note the fracture line through the osteoid tissue and demineralization of the entire bone. He was told ten years previous to fracture that he had gout and had been on a low protein (low phosphorus) diet for ten years. His serum calcium was 11.0 mg. and phosphorus 3.0 mg. per hundred cubic centimeters at time of first examination and the basal metabolic rate was — 25. He was placed on a high phosphorus diet and 2,700 units of vitamin D daily, 3 grains (0.2 Gm.) of thyroid daily and given diluted hydrochloric acid by mouth.

In the treatment of fractures in cases of low serum calcium alone one need not consider vitamin D medication. Most of these fractures will heal quickly enough so that vitamin D deficiency will not become a problem.

In cases of low phosphorus we have found that the administration of from 2,500 to 3,000 units of vitamin D daily is sufficient. This dose is continued until subsequent serum phosphorus determinations indicate the desired level of from 3.5 to 4 mg. per hundred cubic centimeters has been reached. We recommend the use of cod liver oil or halibut liver oil concentrate. The dose is easier to control with these preparations. In using more potent preparations of vitamin D there is more danger of overmedication, and some preparations are found to be toxic. The feeding of high phosphorus-containing foods is most important.

p_H LEVELS

Minerals, especially calcium, phosphorus and iron, are absorbed mostly in the small intestine. Unless there is a sufficient amount of free hydrochloric acid in the stomach to neutralize partially the alkaline duodenum, minerals become insoluble and pass through the intestinal tract unabsorbed. Calcium may combine with fats and form an insoluble calcium soap, and it may combine with the phosphates or oxalates and pass through the intestinal tract in these forms. Alkaline tissue suppresses calcium ionization.

In the management of fractures it is not practical to make a gastric analysis for free hydrochloric acid as a routine procedure. Unless the patient's history, such as one of ulcers or of burning, indicates hyperacidity, give from 15 to 20 drops of diluted hydrochloric acid in one-half glass of water during each meal. If the use of diluted hydrochloric acid for a few days causes definite gastric discomfort, it would indicate that the patient probably has a normal production of hydrochloric acid, and acid medication should be discontinued.

In order to minimize the danger of the precipitation of calcium in the urinary tract it is necessary to keep the urine definitely acid to litmus. Teach each patient the use of blue litmus paper.

Warn the patient against the use of too much citric acid fruit juices, bicarbonates, citrocarbonates and other alkaline powders.

To keep the urine acid it may be necessary to give ammonium chloride, which is best given in the form of 7½ grain (0.5 Gm.) enteric coated tablets. Give 1 or 2 tablets two or three times a day as necessary.

Unless there is already urinary stagnation with infection, the danger of the precipitation of calcium in the urinary tract is not a problem if the urine is kept acid.

THYROID

For many years the orthopedic surgeons have observed the beneficial effect of administration of thyroid in the treatment of some cases of delayed union. This is due to the establishment of normal oxidation of all tissues and not a direct effect on bone.

If one is treating a patient with definite evidence of osteoporosis or an acromegalic type of bone a basal metabolism test should be made, and if it is found to be below — 10, the proper dosage of thyroid indicated in the case under management should be given.

Almost all hyperthyroid patients have hypocalcemia. Hyperthyroidism increases the excretion of calcium in the urine. It tends to produce hypocalcemia and osteoporosis. If the patient under management has definite signs of hyperthyroidism, give 10 drops of compound solution of iodine in a little milk with each meal, or from 3 to 6 tablets of diiodotyrosine daily for thirty days.

Fig. 12 (Mr. S.).—Note the increased density of the entire bone in fourteen weeks. The patient returned to work at this time.

SUMMARY

Blood chemistry determinations should be made early in all fracture cases so that accurate medical management can be instituted immediately.

The object of this management is to establish a serum calcium concentration of from 10.5 to 12 mg. per hundred cubic centimeters and a serum phosphorus

concentration of from 3.5 to 4 mg. per hundred cubic centimeters with a ratio of 3 calcium to 1 phosphorus.

In addition to milk and calcium medication, the use of solution of parathyroid is suggested to assist in calcium metabolism, and in addition to a diet high in phosphorus the use of vitamin D is suggested to assist in phosphorus metabolism.

A normal amount of free hydrochloric acid in the stomach is necessary to assure the absorption of calcium and phosphorus, which takes place in the small intestine.

The precipitation of calcium in the urinary tract will not be a problem if the urine is kept acid.

It is understood that rapid union means early regeneration of bone—"healing by first intention"—without an excess of callus. Frequently roentgenologists will fail to report healing because of the small amount of callus apparent.

If accurate laboratory facilities are not available it is justifiable in all cases of fracture to institute the medical management recommended in cases of low serum calcium, as at least 85 per cent of all cases of fracture present a low serum calcium.

Since accurate medical management in all cases of fracture has been instituted we have not had a failure in union of fresh fractures, have been able in many cases referred to the clinic to regenerate delayed union, have obtained earlier results and have had fewer cases of permanent disability.

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PELVIC SYMPTOMS OF URINARY TRACT ORIGIN

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The most common presenting symptoms of gynecologic patients are chronic lower abdominal pain and backache. These are usually, but often erroneously, interpreted by the patient as being due to abnormalities of the genital tract. This self-made diagnosis of ovarian or uterine disease too often finds concurrence in the opinion of the surgeon and repeatedly leads to unnecessary and harmful operations. Many, if not a majority, of the pains referred to the lower part of the abdomen and back are not due to genital disorders but are the results of orthopedic defects, gastrointestinal disturbances, or abnormalities of the urinary tract. For many years Hunner has been emphasizing the important relationship between urinary tract conditions and obscure pelvic symptoms. He has stressed the symptom complex of the stricture of the ureter and has repeatedly demonstrated the relief of those symptoms by appropriate treatment.

Genital disease may be simulated by ureteral stricture, stricture of the urethra or contracture of the vesical orifice, chronic urethritis and trigonitis, and rarely by ptosis of the kidney. Although Hunner has been teaching and demonstrating these facts for many years, there are still many of his colleagues who have not as yet accepted his work, including outstanding teachers of gynecology and urology who do not believe that ureteral stricture produces pelvic symptoms. As a result of this skepticism a large number of medical students pass into practice each year without knowledge concerning this important subject. This discussion is therefore presented, not as original work, but in support of the observations of Hunner, David M. Davis and others as to the importance of mild and obscure forms of urinary obstruction and as a reminder, to the surgeon and gynecologist, of the fact that a woman has a urinary tract.

Correct diagnosis of obscure pelvic symptoms requires the correlation of a painstaking history with careful gynecologic and urologic examinations, including exploration of the urinary tract by means of x-rays and cystoscopy.

SYMPTOMATOLOGY

Many women in whom urinary tract pathologic conditions are later shown to exist complain only of symptoms which are described as neurotic: particularly constant nervous tension, attacks of hysteria, paranoid feelings and depression. Frequently these are the only complaints, and a careful history is required to bring out symptoms suggesting an origin in the pelvis or urinary tract. We are convinced that a diagnosis of neurasthenia is untenable until urologic examination has ruled out stricture of the ureter.

Fig. 1 (case 3).—Retrograde pyelogram showing stricture of both ureters.

Dysmenorrhea, while not frequently a result of urinary tract disease, may be caused by ureteral stricture. In such cases the cramps are often of an acquired type, especially in a dysmenorrhea developing for the first time after parturition. The pain may be unilateral and it is usually described as deep in the pelvis, frequently accompanied by sacral or lumbar backache.

Unilateral and bilateral lumbar and sacral backache is in many cases the result of stricture of the ureter, ptosis of the kidneys or any of the several urethral and bladder conditions mentioned.

Read before the Section on Obstetrics and Gynecology at the Ninety-First Annual Session of the American Medical Association, New York, June 13, 1940.

Gastrointestinal symptoms, such as indigestion, chronic constipation and flatulence, have been found by Hunner and others to result from ureteral strictures. A sensation of prolapse and pressure in the pelvis, without actual descensus, is strongly suggestive of some bladder or ureteral disorder. When one considers the

Fig. 2 (case 4).—Intravenous uregram showing stasis and dilatation of both ureters due to stricture.

numerous patients with actual prolapse of the uterus who do not experience this symptom, the deduction is inescapable that something more than mere displacement must exist as the cause. It is necessary in all history taking to cross examine for any slight frequency, nocturia or painful urination, since these are accepted by most women as part of life's normal burdens and are not voluntarily mentioned. Of great significance is the patient's report of previous long continued unsuccessful gynecologic therapy. A woman whose uterus has been suspended, ovaries removed or resected, or on whom an appendectomy has been performed in order to relieve pain which still persists after the operation is almost certain to have some urinary tract difficulty. These symptoms will be illustrated in the case reports to follow.

PHYSICAL EXAMINATION

Abdominal examination in cases of ureteral stricture usually reveals tenderness in the region where the ureter crosses the brim of the pelvis. One or both kidneys may be palpable and are often tender. Examination of the patient in the upright position should not be omitted. The pelvic examination is striking because of the absence of gross pathologic change. Too frequently retroversion and cystic ovaries are assumed to be the cause of lower abdominal and back pains, of which they may be entirely innocent. Tenderness of the ureter as it passes through the pelvis is readily confused with adnexal tenderness and usually may be differentiated by Hunner's technic of palpating the ureter lateral to the cervix.

LABORATORY EXAMINATION

Urinalysis in patients of the type described is of surprisingly little assistance, since frequently pus and bacteria are absent in the stained sediment. It should be recognized that serious disease of the urinary tract may exist without evidences of the trouble in the urinalysis. In the presence of a urethritis or trigonitis numerous epithelial cells may be present, and in about half of these micro-organisms are found.

Urography, on the other hand, is of vital importance in establishing the diagnosis. We have used the intravenous method most commonly and have found it usually satisfactory when the bowels have been emptied by the preliminary use of castor oil. Exposure in the vertical, as well as the horizontal, position is essential. We have often been in disagreement with the roentgenologists and clinicians in interpretation of the films. Gross hydronephrosis, ureterectasis, kinks and strictures of the ureter are readily acknowledged, but minor degrees of these conditions the roentgenologist is inclined to declare within normal limits, while we have proved them to be significant in the light of subsequent clinical observations and progress.

UROLOGIC EXAMINATION

When the passage of a 16 F. urethral catheter meets resistance or causes discomfort, one is justified in assuming the presence of narrowing or irritation. Determination of the bladder capacity should be part of the routine examination. Reduction of the capacity

Fig. 3 (case 5).—Intravenous pyelogram showing the right kidney in normal position but the pelvis slightly dilated.

below 300 cc. is significant and should stimulate a diligent search for the cause. When the complaints of pressure and bearing down in the lower part of the abdomen are accompanied by discomfort on passage of a soft rubber catheter and by a decreased bladder capacity with sterile urine, a presumptive diagnosis of urethritis and trigonitis is made. Urethral stricture, chronic

trigonitis and urethritis are so commonly associated that often they cannot be separated into clinical entities. Endoscopic examination of the bladder may show no definite abnormalities, but prominence of the muscle bundles, even true trabeculation, is frequently presented and is significant of urethral obstruction. The trigon

Fig. 4 (case 5).—In the upright position the right kidney is found much lower.

may show a simple congestion or fine granular or papillary excresences. On withdrawing the endoscope through the bladder neck, one may easily see the constriction, and changes similar to those of the trigon may continue to the midportion of the urethra. The ureteral orifices may be smaller than normal and the surrounding membrane show slight congestion in the presence of stricture higher in the ureter. In a few instances minor degrees of ureterocele are found. The passage of bulbs up the ureters is resisted in one or more areas, and withdrawal is accompanied by a "hang" at these points. The reproduction of the particular type of pain of which the patient complains is frequently elicited when the stricture is stretched by the bulb. The well known appearances in hydronephrosis will not be overlooked by one who is on the alert for stricture of the ureter.

REPORT OF CASES

CASE 1.—*Urethral stricture and contracture of the bladder.* Mrs. C. L., aged 23, had been delivered by low forceps after a mild toxemia of pregnancy. Convalescence was uneventful, but on resumption of normal activity a pronounced low backache developed. Questioning revealed nocturia (from three to four voidings) with daytime frequency at forty-five minute intervals. Pelvic examination revealed no abnormalities of the genitals. The catheterized specimen of urine showed no red blood cells or infection; the bladder capacity was 375 cc. Three treatments, consisting of bladder distentions and irrigations, dilation of the urethra and instillation of 0.25 per cent silver nitrate, entirely relieved the patient of both backache and frequency.

CASE 2.—*Urethral stricture and contracture of the bladder.* Mrs. O. L., aged 34, complained of vaginal irritation with discomfort in the lower part of the abdomen and nocturia (from one to two voidings). The appendix and the left ovary had been removed six months before, and later the cervix had been cauterized but no relief was obtained. Examination revealed no evidence of pelvic abnormality. The urethra was found to be small and irritable; the bladder capacity was 300 cc. The urine was normal. The urethra required dilation before endoscopic examination. The bladder showed definite trabeculation, and the vesical orifice was small and contracted. Fine granular changes appeared over the trigon and inner urethra, accompanied by congestion. Hydraulic distentions and dilation of the urethra, at weekly intervals, effected a cure in six weeks' time. The bladder capacity was increased to 500 cc., and the urethra could be easily dilated to 33. In addition to the relief from physical discomfort, including nocturia, the patient noted also the release from nervous tension. Yearly treatments have maintained her normal health.

CASE 3.—*Ureteral stricture.* Mrs. A. P., aged 25, complained chiefly of constant pain in the left side of the abdomen, with exacerbation during the menses. She had had three full term pregnancies, twenty-two months having elapsed since the third one. One year before, although pyelograms made (fig. 1) had shown abnormalities, the appendix had been removed, but the pain on the left side remained unaffected. Some urinary frequency was present and some tenderness in the left lower quadrant, which seemed to be at the point where the left ureter crossed the brim of the pelvis. Pelvic examination showed no evidence of genital disease. There was very marked tenderness lateral to the uterus, pain being elicited by pressure on the lateral wall of the pelvis. A catheterized specimen of

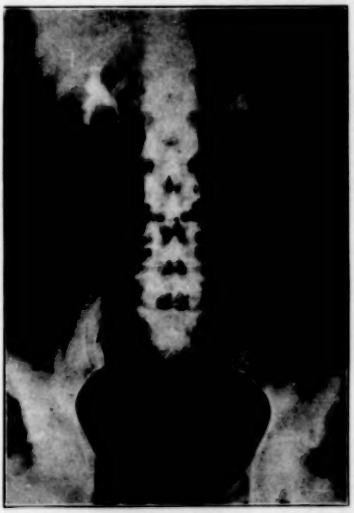

Fig. 5 (case 6).—Urogram shows the stasis and dilatation which had not been suspected before the picture was taken.

urine was negative. After three cystoscopic examinations, with dilation of the left ureter to a 10 F. bulb (no larger bulb could be passed), the patient was free from pain. She could dance, which was something she had been unable to do for the past year, and she has felt so well that she has not yet returned for dilation of strictures in the right ureter revealed by x-ray examination.

Case 4.—*Ureteral stricture.* Mrs. R. E., aged 19, complained chiefly of severe cramplike pains in the right side accompanying menstrual periods, present since the onset of menses and especially severe during her high school years. Additional symptoms were low backache, pain in the right lumbar region and intermenstrual cramplike pain in the pelvis. There were no

Fig. 6 (case 7).—This hydronephrosis is due to stricture of the ureter, which had been present for years.

gastrointestinal disorders and no dysuria. Tenderness was found in the right lower quadrant, median to McBurney's point and too high for the tubo-ovarian region. A catheterized specimen of urine showed an occasional gram-negative bacillus and gram-positive coccus. The appearance of an intravenous pyelogram is shown in figure 2. At cystoscopy the bladder was normal; the right ureteral orifice was slightly congested. This ureter could not be dilated above a No. 8 F. bulb at the initial treatment, which was followed by the first painless menstrual period the patient had ever experienced. The ureter was subsequently dilated to a No. 12 F. bulb. One year later the patient returned with slight recurrence of menstrual cramps. These were relieved by a single treatment and for the past year and a half the patient has been free from pain.

Case 5.—*Ureteral stricture.* Mrs. A. M., aged 39, had been under observation for several years, during which time multiple myomas of the uterus had developed, concurrent with severe lower backache. Because the tumors were impacted deep in the cul-de-sac, it was believed that a hysterectomy would relieve the backache and this operation was accordingly performed. After an uneventful convalescence not only was the sacral backache still present but this affected area had spread to include the right lumbar region. A catheterized specimen of urine showed no bacteria, pus or red blood cells. Intravenous pyelograms (figs. 3 and 4) revealed ptosis of the right kidney with slight dilatation of the ureters and some filling defects. Cystoscopic examination showed the ureteral orifices slightly congested but normal in size. Resistance was encountered in each ureter to a No. 8 F. bulb in the intramural portion and 5 cm. higher. After the ureters had been dilated to a No. 12 F. bulb all pain disappeared and the patient's general health showed marked improvement.

Case 6.—*Ureteral stricture.* Miss A. G., aged 44, complained of weakness, fatigue, pressure in the perineum and pronounced cramps during menstruation. For two months preceding her first visit pelvic pain had also been present during the intermenstrual periods. Pelvic examination was done under general anesthesia because of an intact hymen and showed perfectly normal pelvic organs. Because the description of the patient's cramps seemed to direct attention only to the uterus, endocrine therapy was tried, but without success. Urologic examination was then carried out, in spite of negative results in the catheterized urine. The urethra was tender to catheterization; the bladder capacity was 150 cc. Dilation of the urethra was necessary before the endoscopic examination could be done. This disclosed slight congestion of the bladder and granular excrescences in the urethra. Hydraulic distentions of the bladder, dilation of the urethra and application of silver nitrate effected only partial relief of symptoms. An intravenous pyelogram was therefore made, with results as shown in figure 5. After dilation of the ureters the patient's cure was complete.

Case 7.—*Ureteral stricture.* Mrs. G. D., aged 35, divorced, complained of aching of several years' duration in the right lower quadrant of the abdomen, which had led the patient to submit to removal of the appendix, suspension of the uterus and a subsequent pelvic exploration. She stated that her discomfort was relieved by voiding. There was no nocturia but some frequency during the day. Many attempts at medicinal treatment, including endocrine therapy, had proved futile. A catheterized specimen of urine was negative; the bladder capacity was 390 cc. The appearance of an intravenous urogram is shown in figure 6. After dilation of the right ureter to a No. 12 F. bulb, the patient regained normal health.

Case 8.—*Ureteral stricture.* Mrs. O. B., aged 41, complained of a bearing down pain with occasional colic in the suprapubic

Fig. 7 (case 8).—Double ureter on the left, ureterectasis and ureterocele on the right.

region over a period of ten years. There were some frequency of urination and radiation of pain into the left lumbar region. In spite of symptoms pointing to the urinary tract, the patient had been subjected to removal of the appendix and suspension of the uterus, without relief. Pelvic examination showed no evidence of abnormality. The urethra was contracted; the bladder capacity was 325 cc. The results of an intravenous

pyelogram are shown in figure 7. The details are not as clear as we would wish, but on the left side two kidney pelves can be seen and two ureters merging into one close to the bladder wall. Marked dilatation of the lower right ureter is apparent, a large ureterocele, which is clearly identified as a negative shadow on the more dense bladder shadow. Cystoscopic examination showed but one ureteral orifice, on the left side, while the right side presented a large cystic mass approximately 15 mm. in diameter. This increased and decreased in size with each efflux of urine. Treatment in this case consisted of incising the ureterocele and dilating the left ureter to a No. 12 F. bulb. The patient was entirely relieved of symptoms and has continued in good health. The last examination revealed no vestige of the ureterocele, and there was no resistance to bulbs on that side.

CONCLUSIONS

Obscure abdominal pain is frequently produced by disease of the urinary tract, in many instances accompanied by few or by no manifestations pointing to its true origin. Diseases of the urethra and bladder, and especially stricture of the ureter, produce many varied symptoms. The responsibility for correct diagnosis rests on the surgeon and gynecologist whom such patients usually consult. The dismal failure of pelvic surgery in these cases reflects unfavorably on the whole field of operative gynecology. Unfortunately the operating surgeon rarely sees the end results of his failures, as the patients seek help elsewhere. It is therefore encumbent on the surgeon to make a careful study of the urinary tract before ascribing obscure pelvic symptoms to uncomplicated retroversion, cystic ovaries, chronic cervicitis or even more clearcut forms of pelvic disease.

ABSTRACT OF DISCUSSION

DR. GUY L. HUNNER, Baltimore: The authors render a real service by emphasizing the fact that now, after twenty-five years of many reports similar to theirs, coming from hospitals in all parts of the world, "many of our medical students pass into practice each year without knowledge concerning this important subject." If one turns to one of the best and most recent textbooks on gynecology, produced in 1938 by Arthur Curtis, one will find excellent chapters on backache, dysmenorrhea and dyspareunia, in none of which is mentioned ureteral stricture, the primary cause of the symptoms in many of these unhappy and troublesome cases. The gynecologist who leaves out of account this important lesion is rendering false diagnoses and fruitless treatment in at least 50 per cent of his cases in which backache is complained of. I think a conservative estimate on his cases of dysmenorrhea would almost reach this same figure. In his cases of dyspareunia, if those apparently due to some psychic repulsion and those manifestly due to some lesion about the external genitalia, the vagina, the cervix and the uterine ligaments are excluded and only those cases which in the past have given so much trouble in diagnosis are included, it would be found that most of them are of urologic rather than gynecologic origin. As the authors have said, the surgeon and gynecologist must bear in mind that the woman complaining of a symptom the cause of which is not at once manifest has a urinary as well as a genital tract. The failure to make a correct diagnosis in this large group of patients is the more inexcusable because of the ease with which one can decide whether the urinary tract is at fault. When it becomes established practice in gynecology to palpate carefully along the entire urinary tract, particularly over the juxtavesical portion of the ureter, and in doubtful cases to use a bulb on the diagnostic catheter and the Kelly differential test for pain by slightly distending the kidney pelvis, many problems in diagnosis which have seemed baffling will become simple. Many of the newer operations, such as sympathectomy, presacral neurectomy and the more recent alcohol injection of Frankenhäuser's plexus for the "broad ligament neuritis" of James Young and his followers in Britain, all designed to further the well-being of the patient, will lose much of their popularity because of the more logical, simple and effectual methods of treatment when a correct diagnosis is established.

DR. I. W. KAHN, New York: About ten years ago I published a paper in the *American Journal of Obstetrics and Gynecology* stressing the importance of a urologic examination of every gynecologic patient. At present, in my department, the Female Cystoscopic Department of the New York Post-Graduate Hospital, every patient who is admitted for a gynecologic checkup is automatically sent to the Female Cystoscopic Department for a urologic investigation. At another organization I presented about sixty slides of urologic pathologic conditions that we found in patients who had practically no urologic symptoms. From this presentation one of the doctors present thought I was a practicing urologist instead of a gynecologist. I told him that every one of those conditions—stones, stricture, hydronephrosis, tumors, tuberculosis, and so on—were all found in patients who went through a routine urologic checkup. It is simple to give a patient such a checkup. The examining cystoscope today is no more to us than a thermometer and the stethoscope. The bladder of every patient who comes into the gynecologic clinic is looked at and if necessary we do an intravenous and retrograde pyelogram as well as catheterization of both ureters. Another interesting thing that we do in obstetrics is to inject 20 cc. of diodrast intravenously, and it is remarkable how quickly one can get knowledge about the ureters and kidneys of patients whose urologic system is not acting according to normal. I suggest that the diodrast investigation be considered for obstetric patients. It is a simple procedure.

DR. PRESTON T. BROWN, Phoenix, Ariz.: The title of this paper is somewhat misleading in that the symptoms enumerated are not truly pelvic symptoms at all; they are urinary tract symptoms. They are so closely related and so closely simulate genital symptoms that they are repeatedly mistaken for gynecologic conditions by the patient, and they are also mistaken by the gynecologist as well as the surgeon. It is especially true that the surgeon mistakes these for pelvic conditions when he finds these slight anatomic and mechanical variations from the usual pelvic anatomy, such as movable retroversions, cystic ovaries and the uterus placed lower or farther back in the pelvis than normal. The complete gynecologist must survey many specialties from psychiatry to proctology, but if he is to afford women the most effective service he must combine with his gynecology, above all else, urology. All practitioners command the information obtained from the catheterized urine specimen, calibration of the urethra and determination of the capacity of the bladder. Dr. Hunner mentions that the intravenous pyelogram is in most cases satisfactory for the diagnosis of mild and obscure forms of ureteral obstruction. It does, however, require a carefully made picture and an interpretation that is different from that of the usual roentgenologist. Many of the x-ray men look at our pictures and say they show normal urinary tracts, and indeed one can obtain better pictures by the retrograde procedure. However, for the noncystoscoping gynecologist the availability of the intravenous method is very tempting. The patients who have been described in the paper are selected from a large group of other similar patients found in a small town gynecologic practice, and if one hunts for them one will find them everywhere.

Individual Differences.—Because of the unique combination of ancestral traits that appears in each individual, there are differences between children in the same families. In no one person do we see realized all the potentialities with which he was endowed at birth. There are present in each individual many possibilities that will never be utilized by the forces surrounding that person. The effect of environment is to weed out some traits and to emphasize others. Difficulties or lacks are often exaggerated by the circumstances of the individual's life. Recognition of the individual differences to be found in each family of children may lead to planning an environment which stimulates to a greater extent the individual characteristics and potentialities of each child.—Faegre, Marion L., and Anderson, John E.: Child Care and Training, Minneapolis, The University of Minnesota Press, 1940.

HYPERTENSION ASSOCIATED WITH UNILATERAL RENAL DISEASE

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Recent advances in our knowledge of the underlying causes of hypertension are increasing the interest of the entire medical profession in that often fatal disease.

Evidence is accumulating which suggests that many patients with essential hypertension may be improved or perhaps cured by neurosurgical operations. In this group of patients the neurophysiologic background of the disease is little understood, and certainly the manner in which improvement or cure is effected after operation has not been elucidated. Certain failures after these operations may occasionally be traced to errors in diagnosis in that the hypertension is not of the so-called essential type but is found to result from a definite organic lesion.

Fig. 1 (case 1).—Intravenous pyelogram showing marked hydronephrotic changes of the left kidney. Normal right kidney.

Since Goldblatt's demonstration of a renal origin for hypertension clinicians have sought to demonstrate a causal relationship between various organic lesions of the kidney and abnormal elevations of the blood pressure. The clinical demonstration that such causal relationships do exist has opened up a new field of investigation and has shown the necessity of including a complete urologic study in the investigation of any hypertensive patient. We now know that many patients formerly described as having essential hypertension show gross lesions of one or both kidneys, which in many instances can be demonstrated to be the cause for the hypertension. An enumeration of all of the gross renal lesions responsible for hypertension cannot be made at this time and must await further clinical investigations, but certain phases of the problem which appear to warrant positive conclusions may be profitably discussed.

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EXPERIMENTAL EVIDENCE

Goldblatt [1] has demonstrated that ischemia of the kidney produced by partial occlusion of the renal arteries results in an elevation of the blood pressure in laboratory animals. In the dog, unilateral renal ischemia with the opposite kidney intact and normal produces an elevation of blood pressure which is always transient and which never goes into the malignant form. Return of the blood pressure to normal is thought to be the result of the development of collateral circulation in the ischemic kidney. This view is supported by the fact that unilaterally ischemic kidneys which are wrapped in a cellophane membrane at the time the vessels are clamped always produce a permanent hypertension. Removal of the unilaterally ischemic kidney or the constricting arterial clamp is always followed by a return of the blood pressure to the normal level. Removal of the normal kidney with the opposite kidney ischemic results in permanent hypertension.

Bilateral renal ischemia in the dog produces permanent hypertension. Goldblatt reported that moderate bilateral arterial constriction produces a permanent benign hypertension. Removal of the arterial constriction in the group of animals with this condition results in a lowering of the blood pressure to normal, gradual after removal of constriction from one kidney and abrupt after simultaneous removal from the two kidneys. Excessive bilateral arterial constriction results in malignant hypertension, which invariably terminates fatally with the animals dying of renal insufficiency. In these animals the malignant phase of hypertension is heralded clinically by impairment of renal function as demonstrated by the urea clearance test and is demonstrated pathologically by parenchymatous changes of cellular necrosis in the kidneys with or without hemorrhage, while other organs of the body show widespread arteriolar necrosis and necrotizing arteriolitis. Dogs with benign hypertension have not shown any of these pathologic changes. In the animals showing clinical signs of malignant hypertension, i. e. having impairment of renal function, removal of arterial constriction from one or both kidneys has failed to relieve the hypertension and has not altered the fatal course of events, demonstrating that the pathologic changes of malignant hypertension observed in these experiments are irreversible.

Wilson and Byrom [2] have recently shed further light on this subject. Working with rats, they found that unilateral renal ischemia frequently produced permanent hypertension. In animals with this condition they recognized two main types of change clinically and pathologically.

The first type comprised those in which the blood pressure rose gradually over a period of several weeks to reach a steady high level which, in animals still under observation, had been maintained for nine months. These animals appeared clinically to be in normal health.

The second type comprised those in which the hypertension ran a more irregular course and often led to a state of great weakness, wasting, coma and occasionally convulsions and terminated in death. These symptoms were not considered due to renal insufficiency, for the blood urea was within normal limits, and removal

1. Goldblatt, Harry: Studies on Experimental Hypertension: XII. The Experimental Production and Pathogenesis of Hypertension Due to Renal Ischemia, Am. J. Clin. Path. 10: 40-72 (Jan.) 1940. (This article gives a complete Goldblatt bibliography.)

2. Wilson, Clifford, and Byrom, F. B.: Renal Changes in Malignant Hypertension, Lancet 1: 136 (Jan. 21) 1939.

of the ischemic kidney was sometimes followed by rapid clinical improvement with return of the blood pressure to normal.

The pathologic changes noted in this second group of animals are of interest.

The ischemic kidney often presented no macroscopic or histologic abnormality; more often diffuse tubular atrophy was evident, all degrees being observed from slight to severe. Partial infarction of the kidney was not uncommon. Acute glomerular and arterial lesions such as occur in the opposite kidney were not observed.

In the opposite kidney microscopic changes were present which closely resembled those of malignant hypertension in man. The lesions were focal in distribution, glomeruli, tubules and interstitial tissue showing changes closely associated with acute arterial and arteriolar necrosis. Acute arterial lesions similar to those observed in the unclamped kidney were observed in the pancreas, intestine, stomach and heart and more rarely in the adrenal glands, liver and testes. Wilson and Byrom expressed the belief that, since only one kidney is operated on, renal insufficiency is an unlikely factor in the etiology of the vascular lesions observed. This conclusion appears to be supported by the absence of nitrogen retention in their animals. The fact that the lesions do not occur in the clamped kidney appears to indicate that they are not due to a circulating toxin or pressor substance and that they are not due to simple ischemia. Wilson and Byrom also expressed the belief that the production of the lesions is related in some way to the increased intra-arterial tension from which the ischemic kidney is protected by the clip on the renal artery. They suggested that the determining factor is probably a sudden strain imposed on the vessel wall by the combination of severe vasoconstriction and the resultant rapid rise in blood pressure. This could presumably produce a vascular necrosis which in the case of a gradually rising pressure might be prevented by the development of compensatory hypertrophy of the arterial wall.

It is of great interest that whereas Goldblatt's dogs, having what he termed malignant hypertension produced only by bilateral renal ischemia, showed no clinical improvement after removal of the arterial clamps, in Wilson and Byrom's experiments rats that showed clinical symptoms of weakness, wasting, coma and convulsions with hypertension after the production of unilateral renal ischemia have shown recovery from all symptoms and have regained normal blood pressures after removal of the clamped kidney.

These differences which have been observed between dogs and rats have not yet been explained. One wonders to what extent conditions in man might parallel the observed changes in either or both of these animals. An answer to this question would be of great clinical importance. Laboratory investigations with other animals should be made to elucidate many points of clinical importance.

CLINICAL EVIDENCE

Recent clinical investigations have suggested that many non-nephritic types of renal lesion may be associated with hypertension. The causal relationship in many instances is not clearly evident; however, there appear to be three definite types of kidney lesions in which the relationship to hypertension is evident:

1. Gross occlusion of one or more arteries leading to the kidney has been observed to produce clinical hypertension in man and in this instance has closely paralleled the experimental work of Goldblatt. Two cases of this unilateral type have been reported in which removal of the diseased kidney resulted in cure of the hypertensive state. In Leadbetter and Burkland's [3] case renal ischemia resulted from partial occlusion of the renal artery by a plug of aberrant muscle, apparently congenital in origin. In the case reported by Boyd and Lewis [4] the ischemic kidney contained an infarct which involved about one third of the organ. The recently reported observations of Blackman [5] may be of far-reaching importance in our understanding of so-called essential hypertension. He studied autopsy material from 50 patients who died in Johns Hopkins Hospital with a diagnosis of essential hypertension. Arteriosclerotic changes producing partial occlusion of the main renal arteries were found in 86 per cent of these cases, while only 5 per cent of a control series who had no clinical hypertension showed these gross vascular changes.

We have, in a previous communication, pointed out the possibility of renal ischemia with hypertension resulting from trauma of the kidney, reporting a case

Fig. 2 (case 2).—Intravenous pyelogram showing nonvisualization of the left kidney; the right kidney is normal with hypertrophy.

in which malignant hypertension developed in a patient who had previously had a severe injury to one kidney resulting in an infarction of about one third of the organ. Sterling [6] has observed elevated blood pressure in experimental animals having gross traumatic renal lesions.

2. The association of hypertension with urinary obstructions has been long recognized clinically. Experimental evidence has supported this observation in that unilateral or bilateral ureteral ligation has resulted in the production of elevated blood pressures in laboratory animals.[7] A possible explanation for hypertension produced in this manner may well lie in the experimental

3. Leadbetter, W. F., and Burkland, C. E.: Hypertension in Unilateral Renal Disease, J. Urol. **39**: 611 (May) 1938.
4. Boyd, C. H., and Lewis, L. O.: Nephrectomy for Arterial Hypertension, J. Urol. **39**: 627 (May) 1938.
5. Blackman, S. S., Jr.: Arteriosclerosis and Partial Obstruction of Main Renal Arteries in Association with "Essential" Hypertension in Man, Bull. Johns Hopkins Hosp. **65**: 353-375 (Nov.) 1939.
6. Sterling, W. C.: Verbal communication to the authors.
7. Hartwich, Adolf: Der Blutdruck bei experimenteller Urämie und partieller Nierenausscheidung, Ztschr. f. d. ges. exper. Med. **89**: 462, 1930. Harrison, T. R.; Mason, M. F.; Resnik, H., and Rainey, J.: Changes in Blood Pressure in Relation to Experimental Renal Insufficiency, Tr. A. Am. Physicians **51**: 280, 1936. Bell, E. T., and Pedersen, A. A.: The Causes of Hypertension, Ann. Int. Med. **4**: 227 (Sept.) 1930.

studies of Hinman [8] on the pathogenesis of hydronephrosis. He demonstrated that hydronephrotic atrophy of the renal parenchyma results not primarily from increased intrapelvic pressure but from ischemia with a progressive obliteration of the intrarenal vascular supply. The relative infrequency with which hydronephrosis is associated with hypertension may be explained

Fig. 3 (case 2).—Section of right kidney showing normal anatomy with exception of postmortem changes.

by the development of collateral circulation in the kidney which has been demonstrated to occur in the presence of the obstructive uropathies.

We have observed three cases in which hydronephrosis was associated with hypertension and in which the blood pressure returned to normal after appropriate management of the obstructive lesion. Two of these cases have been previously reported [9] and the third is herewith presented:

CASE 1.—G. P., a man aged 20, a university student (fig. 1), complained of intermittent attacks of severe pain in the region of the left kidney for three years. Attacks occurred at frequent intervals and were of two to three days' duration. The patient was known to have had hypertension for three years. (Observations were made at the University Health Service.)

Examination revealed acute tenderness of the left costovertebral region with muscular spasm on admission. Physical examination otherwise was normal except for blood pressure, which was 180 systolic and 90 diastolic. The urine showed a few red cells but no other abnormality. The blood nonprotein nitrogen level was 27.8 mg. per hundred cubic centimeters. Excretory urograms showed a normal right kidney and 3 plus hydronephrosis of the left kidney.

Excision of the left kidney was performed Jan. 18, 1940. A large hydronephrotic sac was removed.

The pathologist's report revealed advanced hydronephrotic atrophy.

Postoperative convalescence was normal, the blood pressure attaining a normal level immediately after operation, where it has remained to date. The highest reading during the postoperative period thus far was 134 systolic and 79 diastolic.

3. The other condition which has been more frequently observed to be associated with hypertension is chronic pyelonephritis. Longcope [10] followed 22 cases of bilateral chronic pyelonephritis for a long period of time. In 10 of 15 cases which he followed to advanced or terminal stages, clinical hypertension developed. The hypertensive patients which he observed all had demonstrable reduction of renal function, and he tended to associate the occurrence of renal insufficiency with that of hypertension. Pathologic examination of tissues after death in this series failed to disclose any important or constant vascular changes which Longcope could consider responsible for the clinical hypertension.

Butler [11] reported on observations carried out in a series of 15 children having chronic pyelonephritis with associated hypertension. In these cases impairment of renal function was not observed coincidentally with the onset of hypertension. Pathologic material from 3 of the patients disclosed marked arteriolar thickening within the diseased kidneys. In 2 of the cases reported by Butler there was hypertension associated with unilateral chronic pyelonephritis, and nephrectomy is reported to have cured both patients. Numerous cases have been reported in the recent literature [12] in which unilateral chronic pyelonephritis with associated hypertension has been submitted to nephrectomy. In most of the cases reported, an improvement or cure of the hypertension appears to have followed operation. Factors which may militate against a favorable outcome in such cases may be either the presence of an extrarenal cause for the hypertension or a vascular lesion of the surviving kidney which tends to perpetuate the hypertension.

Time and space do not permit a detailed account of the 12 patients we have observed having obvious unilateral chronic inflammatory lesions of the kidney associated with hypertension. Most of the cases have been previously reported. Ten patients have been operated on, while in 2 the diagnosis has been established by autopsy.

Fig. 4 (case 2).—Section of left kidney showing marked inflammatory changes and vascular sclerosis.

Three cases are herewith presented because they illustrate certain points of interest:

CASE 2.—*History.*—F. R., a white girl aged 14, admitted Nov. 21, 1937 (figs. 2 and 3), in October 1936 had gradually

8. Hinman, Frank: The Pathogenesis of Hydronephrosis, Surg., Gynec. & Obst. **58**: 356-376 (Feb., no. 2 A) 1934.

9. Nesbit, R. M., and Ratliff, R. K.: Hypertension Associated with Unilateral Nephropathy, J. Urol. **43**: 427 (March) 1940.

10. Longcope, W. T.: Chronic Bilateral Pyelonephritis: Its Origin and Its Association with Hypertension, Ann. Int. Med. **11**: 149 (July) 1937.

11. Butler, A. M.: Chronic Pyelonephritis and Arterial Hypertension, J. Clin. Investigation **16**: 899 (Nov.) 1937.

12. Barney, J. D., and Suby, H. I.: Unilateral Renal Disease with Hypertension, New England J. Med. **220**: 744 (May 4) 1939. Barker, N. W., and Walters, Waltman: Hypertension Associated with Unilateral Nephritis: Treatment by Nephrectomy, Proc. Staff Meet., Mayo Clin. **12**: 118 (Feb. 23) 1938. Crabtree, E. G.: Hypertension in Destructive Infected Unilateral Lesions of the Kidney, Tr. Am. A. Genito-Urin. Surgeons **31**: 299, 1938. Mulholland, S. W.: Hypertension's Challenge to Urology, J. Urol. **42**: 957 (Dec.) 1939.

increasing productive cough, dyspnea with exertion, orthopnea, palpitation and tachycardia; also associated intermittent episodes of precordial oppression which became more marked one week previous to admission. There were also occasional mild headaches but no visual changes.

Examination.—The patient was well developed and nourished and had moderate respiratory difficulty; her temperature was

Fig. 5 (case 3).—Retrograde pyelogram showing a gross destructive process of right kidney suggestive of tuberculosis. Left kidney is normal with hypertrophy.

100 F., respiratory rate 38 and pulse rate 120; the ocular fundi showed moderate venous engorgement. Cardiac examination revealed a visible apex impulse over the entire precordium and a lower border of cardiac dulness in the sixth interspace 10 cm. from the midsternal line. The aortic and pulmonic second sounds were greatly accentuated; the blood pressure was 210 systolic and 150 diastolic. Intravenous pyelograms Dec. 31, 1936, showed a large normal right kidney; the left was not visible.

Laboratory Findings.—The blood Kahn reaction was negative. The blood showed red blood cells 5,100,000, hemoglobin 90 per cent (Sahli) and white blood cells 13,000. The urine (Dec. 8, 1936) showed albumin 2 plus, increasing to 4, and a variable number of casts, loaded with white blood cells and bacilli. Urea clearance was 124 per cent. An electrocardiogram showed sinus tachycardia and myocardial changes.

Course in Hospital.—The patient was given sedatives and digitalis. Other symptomatic and specific therapy instituted gave no relief from cardiac symptoms, nausea and vomiting, edema, infection of the urinary tract or terminal pneumonia. Respirations ceased at the end of the third month of hospitalization. The blood pressure had gradually decreased through the last illness and was 70 systolic and 50 diastolic three days before death.

Autopsy.—Postmortem examination revealed advanced, practically complete pyohydronephrotic atrophy and fibrosis of the left kidney; vascular thickening in the left kidney; cardiac insufficiency, and hypertrophy and dilatation of the right and left ventricles. The right kidney showed some compensatory hypertrophy, with small arteriosclerotic foci of fibrosis and atrophy beneath the capsule. The kidney was essentially normal, as were other viscera of the body.

In this case death occurred as a result of hypertension with cardiac decompensation. One may reasonably infer that chronic unilateral pyelonephritis was the cause of this child's hypertension. Microscopic examination of the various tissues did not disclose any of the changes of necrotizing arteriolitis ordinarily associated with malignant hypertension. It is noteworthy that on admission the urea clearance test was normal. Considering the relatively normal condition of other organs of the body as seen at autopsy, including the opposite kidney, we feel that an early nephrectomy might have saved the life of this patient.

CASE 3.—*History.*—A. B., a white man aged 35, admitted in November 1938 (figs. 4 and 5), had had repeated attacks of gross hematuria with onset five months before. For as long as ten years he had recurring aching pain in the right flank. There was a known blood pressure of 185 systolic and 110 diastolic for over a year.

Examination.—The blood pressure was 200 systolic and 110 diastolic. Ophthalmoscopic examination revealed old hemorrhagic and exudative retinitis in each eye and mild hypertensive retinitis in each eye. Blood studies showed the blood to be normal. The blood Kahn reaction was negative. The nonprotein nitrogen level was 27.6 mg. per hundred cubic centimeters; urea clearance was 63 and 58 per cent. The urine was normal, with the exception of a few red blood cells; a culture of it was positive for Staphylococcus albus. In a split function test there was appearance of dye from the right kidney in five minutes and from the left in one minute. Pyelograms showed the right kidney to have advanced changes of chronic infection and the left to be normal.

Operation.—Excision of the right kidney was performed Nov. 3, 1938. A small, contracted and rather cystic-appearing kidney was removed.

Pathology.—The excised kidney measured 7 by 3 by 3 cm. The cut surface showed marked dilatation of the pelvis and calices with atrophy of the parenchyma. Microscopic study revealed inflam.natory infiltrations beneath the mucosa, marked sclerosis of arterioles and arteriosclerotic nephropathy with advanced pyohydronephrotic atrophy.

Result.—The blood pressure gradually fell to 140 systolic and 90 diastolic on discharge from the hospital. Eight months postoperatively it was 140 systolic and 80 diastolic, and thirteen months postoperatively, 130 systolic and 86 diastolic, the patient

Fig. 6 (case 3).—Section showing marked sclerosis of arteries and inflammatory infiltration beneath pelvic mucosa.

working daily as a laborer. A urea clearance test showed the clearance to be 44 and 46 per cent. Changes in the eyegrounds were the same as they had been preoperatively. Sixteen months postoperatively the blood pressure was 145 systolic and 90 diastolic.

In this case the removal of an advanced unilaterally pyelonephritic kidney has resulted in marked improvement of the patient's hypertension. Vascular changes elsewhere in the body as demonstrated by the eyegrounds may have resulted from the hypertension. A regression of these secondary vascular changes is problematic.

Of the 10 patients submitted to nephrectomy for advanced inflammatory lesions of one kidney associated with hypertension, 6 have shown marked and lasting improvement in symptoms as well as a persisting lowered blood pressure. Some of these patients have shown a normal total renal function as demonstrated by the

Fig. 7 (case 4).—Retrograde pyelogram showing a small contracted left kidney with a deformity of the pelvis characteristic of pyelonephritis. The right kidney is normal with moderate hypertrophy.

phenolsulfonphthalein, the nonprotein nitrogen and the urea clearance tests. Some have shown moderate impairment of function as determined by the phenolsulfonphthalein and urea clearance tests. Improved tests of renal function such as the inulin clearance and diodrast clearance tests may be of value in the future in determining the patients most suitable for operation and in establishing some clue as to prognosis.

Case 4.—*History.*—E. B., a white woman aged 40, admitted in May 1939 (figs. 6 and 7), had had hypertension since toxemia of pregnancy eight years before, but no hypertensive symptoms until the onset of a convulsion in August 1938. Recently she had experienced some blurring of vision but no urologic symptoms. She had had scarlet fever in childhood.

Examination.—The blood pressure was 200 systolic and 120 diastolic. The patient had hypertensive retinitis; she also had active chorioretinitis in the left eye and tenderness in the left costovertebral region. The urine was normal. A culture of renal specimens was negative for bacteria. The Kahn reaction was negative. Two urea tests showed the clearance to be 41 per cent and 40 per cent respectively. The nonprotein nitrogen level was 28 mg. per hundred cubic centimeters. A split kidney function (phenolsulfonphthalein) test resulted as follows: Appearance time of dye from the right kidney was immediate, and from the left, ten minutes. The output of the right kidney was 5 per cent in ten minutes, and that of the left, 2.5 per cent. The blood showed hemoglobin 88 per cent, white blood cells 5,200 and red blood cells 5,050,000. Pyelograms showed the right kidney to be normal and the left small, pyelonephritic and contracted.

Treatment.—The left kidney was excised May 29, 1939.

Pathology.—The kidney measured 7 by 3.5 by 2.5 cm. and weighed 25 Gm. Advanced arteriosclerotic nephropathy was present, and primary contraction.

Result.—Postoperative blood pressure varied between 120 systolic and 70 diastolic to 165 systolic and 110 diastolic. Two months postoperatively there was subjective improvement; no convulsions occurred. The blood pressure was 200 systolic and 125 diastolic.

Twelve months postoperatively there was a return of all symptoms, including headaches, convulsions, weakness and blurring of vision. The blood pressure was 225 systolic and 125 diastolic.

The patient just mentioned and three others have been operated on for what appeared to be unilateral inflammatory renal lesions with associated hypertension and have been unimproved by nephrectomy. Studies of renal function carried out in these unsuccessful cases have not importantly differed from the results of the same studies carried out in the more successful cases. Two of the four failures have occurred in female patients who have dated their hypertension to toxemias of pregnancy seven or eight years previously. Perhaps bilateral vascular changes occurred in these 2 patients at the time of their toxemias.

Microscopic examination of the material obtained in 10 cases reveals the constant occurrence of vascular thickening. Whether this vascular change resulting from infection within the kidney has contributed to the production of hypertension is not known. Certainly many patients showing equal amounts of vascular sclerosis without associated hypertension have been observed both by us and by others. Perhaps perirenal fibrosis so commonly seen in these contracted kidneys has prevented an adequate collateral circulation and has been a contributing factor in the production of renal ischemia.

SUMMARY AND CONCLUSIONS

Experimental evidence and clinical observations have shown that hypertension may result from pathologic conditions of the kidney which may be bilateral or unilateral.

Three different types of unilateral renal lesion are most commonly associated with hypertension: (1) those

Fig. 8 (case 4).—Section showing marked sclerosis of arteries.

produced by gross vascular occlusion of the renal arteries including trauma to the kidney, (2) the obstructive uropathies and (3) chronic inflammatory lesions.

Since chronic infection appears to be the most important single etiologic factor, it would appear that the best treatment of this type of hypertension is prophylactic. In this regard the value of modern chemotherapeutic

methods for prevention of chronic infections of the urinary tract cannot be overemphasized.

Hypertensive patients should be submitted to complete urologic study as a part of the routine examination even in the absence of a history of renal disorders or urinary findings suggesting disease of the urinary tract.

The rational treatment of the hypertensive patient with unilateral nephropathy is removal of the diseased kidney, provided the function of the opposite kidney is not importantly reduced. With this restriction, a reasonable expectancy of improvement or cure can be hoped for in the majority of cases.

ABSTRACT OF DISCUSSION

DR. E. GRANVILLE CRABTREE, Boston: We are participating in a magnificent effort to obtain a sound perspective on ischemic hypertension. Investigative work has already established the entity as a real thing, as the cases of Drs. Nesbit and Ratliff have shown, but it is still confused by a multiplicity of interpretations. Most clinics cannot make use of their vast statistics on nephrectomized patients because of insufficient data but must collect from current cases now studied from the blood pressure angle as well as urologically. From three such studies which have been made by me and my associates I doubt that, except as terminal conditions, the number of hypertensive patients found will be as high as we were at first led to suspect, and yet I want to emphasize that intensive search for these cases, such as Drs. Nesbit and Ratliff have made, is most important in the setup. Let me call attention to the nature of vascular damage in acute pyelonephritis. Dr. Prien and I showed in a recent article in the *Journal of Urology* that extensive injury to the vessels in the acute lesion is easily found. Also let me mention that Weiss has shown that vascular nephritis may appear in such cases within six months. Longcope has held that pyelonephritis becomes hypertensive with renal failure, and Butler has found, as Drs. Nesbit and Ratliff have shown, that in children function need not be lost. This is confusing but indicates the importance of the initial lesion. The three surveys which I have show that in pregnancy with pyelonephritis unassociated with toxemia, out of 72 cases, after five to eighteen years after the injury, 8 were hypertensive, with 150 systolic and 90 diastolic as the upper limit of normal blood pressure. Chaset and I have reported the fact which Drs. Nesbit and Ratliff have referred to, that extensive vascular changes could exist without hypertension. Braasch's paper yesterday and this paper today show that these cases are frequent enough to look for and to try to correct. We are now entering on the third phase. The work of Page, which followed that of Goldblatt, and the work of Harrison, Grollman, Williams, and Page and Helmer, show the importance of physiology in contrast to pathology. Histologically these extensive changes may be found without the hypertension. Page's work tends to show that an adjustment is made to the secretion of renin, similar to that noted in the disturbances of the endocrine glands. Charlotte Crabtree has shown glomerular change in the cortex of the kidney which takes place normally in mice at puberty, and in castrates, with estrogen or testosterone injections.

DR. GEORGE WINTHROP FISH, New York: During the past three years Schroeder and I have studied and nephrectomized a group of hypertensive patients from 16 to 32 years of age with unilateral renal lesions, at least as far as we were able to establish such a diagnosis by intravenous and retrograde urography, separate phenol red and urea clearance determinations of the kidneys, and cultures of separated ureteral specimens. Even with all these tests the presence of bilateral lesions is not always ruled out. Perhaps most important of all, the time of the onset of hypertension in these cases was known and those whose hypertension did not extend beyond two years responded most favorably. These cases were reported in the May issue of the *American Journal of the Medical Sciences*. Drs. Nesbit and Ratliff mentioned failure in cases in which hypertension was known to have been present for from six to eight years, and Dr. Crabtree has reported a case in which hypertension returned ten years after nephrectomy. The difficulty of establishing the diagnosis of unilateral kidney involvements, the uselessness of biopsy in the cases, and a striking example of normally functioning kidneys in a far advanced case of hypertension are well shown in one of our recent cases: A white man aged 40 had a stone removed from the right kidney through a pyelotomy incision in February 1937. The blood pressure was 130 systolic and 90 diastolic. In August 1937 the blood pressure was 148 systolic and 100 diastolic. Two attacks occurred of pyelitis on the right side between that date and April 1939. The blood pressure was 165 systolic and 120 diastolic at that time. The patient was first seen by me in October 1939 with the blood pressure ranging from 212 systolic and 140 diastolic to 154 systolic and 100 diastolic. The symptoms were headaches and lassitude. The problem here calls for the early diagnosis and the cooperation of all physicians and surgeons in obtaining complete urologic studies in every case of hypertension. Nephrectomy may prove of benefit but, it seems, only in patients in whom the existence of hypertension is of short duration and in whom arteriolar sclerosis of the other kidney is not advanced. Its use is probably limited, therefore, to a small number of hypertensive patients, and they remain potentially hypertensive. My hope is that before long a substance which will inactivate pressor substances and perform a chemical sympathectomy on these diseased kidneys will appear, and I believe it will.

DR. HENRY A. SCHROEDER, New York: Drs. Nesbit and Ratliff have made a valuable contribution to the knowledge of arterial hypertension associated with organic renal disease. Steele's and my series contain 35 per cent of renal diseases. It is necessary to realize that cases such as these are not a new development. In 1694 Marcellus Malpighi died of such an ailment: unilateral hydronephrosis and calculi; apoplexy, and left ventricular hypertrophy. Richard Bright in 1840 described four cases in which apparently this same condition existed, that is left ventricular hypertrophy, a recognized index of hypertension, and unilateral renal disease. After a lapse of a hundred years it is being again recognized that cases of arterial hypertension exist in which various kinds of renal diseases seem to play part of the causative role. Many, including myself, have been able to duplicate in animals, especially rats, some of these renal lesions and to produce hypertension, thereby establishing an experimental analogue for such cases. The significance of infection is still undetermined. The presence of arteriolar lesions, to which these authors have drawn attention, is most important. If the work of Wilson and Byrom is right, one is forced to the conclusion that vascular disease in the remainder of the body, including the unaffected kidney, is the result and, therefore, secondary to the existence of hypertension. It naturally follows that hypertension initiated by a unilateral renal disorder may be maintained, after the affected kidney is removed, by the secondary vascular disease in the other kidney, as was said, if this disease has progressed to an irreversible degree; if it has not, hypertension might well, for a temporary period, regress. One question remains to be answered, and the answer may contain the essence of the etiology of hypertension. Why do some persons with certain renal diseases develop hypertension while others with the same diseases do not? It appears that there are two factors at work in this type of case, a constitutional, perhaps hereditary, one and a renal one. Removal of the renal factor may result in regression, although I believe that these patients are still potentially hypertensive. Nephrectomy for hypertension seems to be a valuable palliative for a small group of cases in which the hypertension is of short duration, in which the arteriolar sclerosis of the other kidney is reversible, and in which the renal disease is confined to one kidney.

DR. REED M. NESBIT, Ann Arbor, Mich.: At the University Hospital one sees a large number of patients with hypertension referred from the medical and neurosurgical departments. This has been especially true in recent months because of increased recognition of the possibility of hypertension's being associated with renal infection even in the absence of urologic symptoms. Although the incidence of these cases is low as shown by the daily study of hypertensive cases in the clinic and reviews of nephrectomized patients, recognition of the syndrome does increase the number of both diagnoses and operations.

BLASTOMYCOSIS AND THE BLASTOMYCOSIS-LIKE INFECTIONS

LESLIE M. SMITH, M.D.
EL PASO, TEXAS

The clinical entity known since 1894 as Gilchrist's disease or American blastomycosis has usually been thought of as a mycologic entity as well. The subject has been complicated, however, by the incrimination of a number of different fungi as the causes of quite similar lesions. It seems best, as Benham [1] has suggested, to reserve the name blastomycosis for lesions caused by the species of fungus described by Gilchrist and named Blastomyces dermatitidis and to apply appropriate names to the other somewhat similar diseases caused by other species of fungi. The latter may be collectively designated as the blastomycosis-like infections. This term will be applied here to the mycotic granulomas in which yeastlike cells are found, whether or not they are characterized by budding.

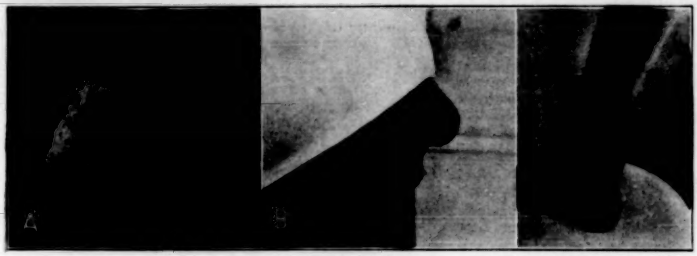

Fig. 1.—Three mycoses which present miliary abscesses and a verrucous surface: *A*, blastomycosis of Gilchrist; *B*, superficial type of coccidioidal granuloma; *C*, deep moniliasis.

My purpose in this paper is to present these more or less similar diseases as a group and to emphasize their similarity and the importance of their differentiation in practice. This work is based on personal experience with several members of the group, study of cultures and histologic sections of most of the others and review of the literature of the entire group. The point of view is that of the clinician rather than that of the professional mycologist, and many of the finer details of mycology are omitted.

The more thorough the mycologic studies become the more different the fungi are found causing the disease pictures which fit into this group. In view of the different courses and prognoses of these diseases the importance of identification of the organism in each case is at once apparent. Clinical characteristics, although suggestive, are usually not sufficient for accurate diagnosis. The appearance of the organism in the tissue is often not sufficiently characteristic for identification. Thorough mycologic studies are likely to yield information of prognostic and therapeutic importance.

Certain of the blastomycosis-like diseases may be suspected from their geographic origin, although this is of diminishing importance since more and more cases are being observed in geographic areas in which they have not hitherto been known to exist.

Others are suspected from their more or less characteristic clinical features, their minute structure and the type of parasitic cell found. A verrucous surface and miliary abscesses have usually been considered characteristic of Gilchrist's disease, but these features may occur in the superficial type of coccidioidal granuloma, and Smith and Lewis [2] have reported a blastomycosis-like lesion of the leg, apparently due to Monilia nigra, with the same characteristics. The extreme adenopathy of paracoccidioidal granuloma suggesting Hodgkin's disease, the marked fungating character of chromomycosis, the polypoid tumors of rhinosporidiosis, the gelatinous contents of torular abscesses and the kala-azar-like syndrome of histoplasmosis are distinguishing clinical features.

Fig. 2.—Verrucous surface and intra-epidermal abscesses in three different mycoses: *A*, blastomycosis of Gilchrist; *B*, superficial type of coccidioidal granuloma; *C*, deep moniliasis (Monilia nigra).

Read before the Section on Dermatology and Syphilology at the Ninety-First Annual Session of the American Medical Association, New York, June 14, 1940.

Drs. George M. Lewis, Fred Weidman, H. P. Jacobson, Morris Moore, George Caldwell, Sidney Wilson, Ethel Rockwood and C. D. Stewart, placed cultures, microscopic slides and other material at my disposal for assistance in this study.

1. Benham, Rhoda W.: The Fungi of Blastomycosis and Coccidioidal Granuloma, Arch. Dermat. & Syph. **30**: 385 (Sept.) 1934.

2. Smith, L. M., and Lewis, G. M.: Deep Mycotic Infection Caused by Monilia Nigra, South. M. J. **29**: 1067 (Nov.) 1936.

As to the parasitic cells, those of Gilchrist's disease and coccidioidal granuloma may be indistinguishable at certain stages. Budding cells are not always found in Gilchrist's disease without very thorough search, and endosporulating cells are absent from many sections of coccidioidomycosis. If the multiple protoplasmic buds of paracoccidioidal granuloma are not demonstrable, the cells are much like those of coccidioidal granuloma and blastomycosis of Gilchrist. The round,

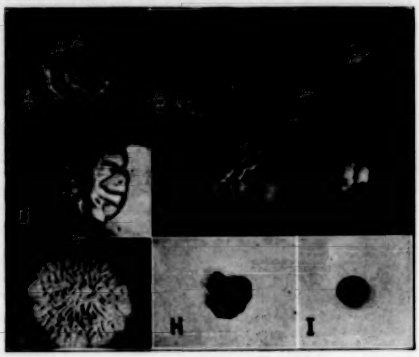

Fig. 3.—Cultures of *A*, Blastomyces dermatitidis, *C*, Coccidioides immitis, *C*, Paracoccidioides brasiliensis, *D*, Torula histolytica, *E*, Monilia albicans, *F*, Paracoccidioides cerebriformis, *G*, Sporotrichum schenckii, *H*, Hormodendrum (compactum?) and *I*, Phialophora verrucosa.

dark, thick-walled, nonbudding cells of chromomycosis are characterized by grouping and transverse fission. Budding yeastlike cells occur in several members of the group. Rockwood [3] states that in the case of deep moniliasis reported by Greenwood and Rockwood [4] the budding cells were not encapsulated. Hyphae may also

TABLE 1.—*Geographic Distribution of Blastomycosis and Blastomycosis-like Infections (from Reported Cases)*

Blastomycosis	North America, especially central states of United States
Coccidioidomycosis	United States, especially the valley of California; few cases in South America
Paracoccidioidal granuloma	South and Central America
Chromomycosis	South America, West Indies, United States, Russia, Japan, Africa
Moniliasis (deep)	United States
Torulosis	Europe, United States
Sporotrichosis	Throughout the world
Scopulariopsosis (deep)	United States (Colorado), Europe, Africa
Rhinosporidiosis	India, Ceylon, Italy, North and South America
Histoplasmosis	United States, Central America, Isthmus of Panama

be present in moniliasis. The encapsulated budding cells of torulosis, although smaller, may be mistaken for young forms of Blastomyces. The minute, nonbudding, round bodies, as described by Markley, Philpott and Weidman,[5] should lead one to suspect scopulariopsosis. I have studied sections from Caldwell and Roberts' [6] case of rhinosporidiosis, and I do not believe that the cystlike sporangia of that disease could be confused with any other condition. The many small conidia found in histoplasmosis within the endothelial and giant cells are characteristic. The round and oval conidia of Sporotrichum are difficult to identify, although Lawless [7] gives variation in size and a tendency to grouping as characteristic features of these cells.

THE ORGANISMS

In some of the diseases of the blastomycosis-like group a single species of fungus is responsible almost invariably for the condition; in others there is a multiplicity of organisms capable of causing identical lesions. Unfortunately there is not a uniform nomenclature among mycologists, and fungi given different names and classifications have been found to be the same or closely related organisms, so that the multiplicity is not as great as at first appears. A uniform nomenclature would eliminate much of the confusion that now exists. A number of supposedly different strains have been described as the cause of certain cases of Gilchrist's disease. Benham [1] studied five such strains and found them sufficiently similar to classify them all in the species described by Gilchrist.[8] The organism of coccidioidomycosis, originally thought to be protozoon, was shown by Ophuls and Moffitt [9] to be a fungus, and the name Coccidioides immitis was applied to it by Rixford and Gilchrist. So-called South American blastomycosis or paracoccidioidal granuloma is caused by several species of Paracoccidioides, most often Paracoccidioides

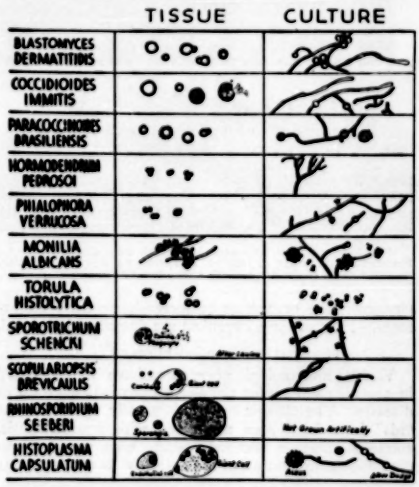

Fig. 4.—Diagrammatic representation of organisms in tissue and culture.

brasiliensis. Moore [10] states that the generalized form of the disease is due to Paracocidioides brasiliensis and P. tenuis, and the localized form involving the buccal mucosa to P. cerebriformis.

3. Rockwood, Ethel M.: Personal communication to the author.
4. Rockwood, Ethel M., and Greenwood, A. M.: Monilial Infection of the Skin—Report of a Fatal Case, Arch. Dermat. & Syph. **29**: 574 (April) 1934.
5. Markley, A. J.; Philpott, O. S., and Weidman, F. D.: Deep Scopulariopsosis of Ulcerating Granuloma Type Confirmed by Culture and Animal Inoculation, Arch. Dermat. & Syph. **33**: 627 (April) 1933.
6. Caldwell, G. T., and Roberts, J. D.: Rhinosporidiosis in the United States, J. A. M. A. **110**: 1641 (May 14) 1938.
7. Lawless, K. L.: Diagnosis of Sporotrichosis, Arch. Dermat. & Syph. **23**: 381 (Sept.) 1930.
8. Gilchrist, T. C.: Case of Blastomycetic Dermatitis in Man, Johns Hopkins Hosp. Rep. **1**: 269, 1896.
9. Ophuls, William, and Moffitt, H. C.: Philadelphia M. J. **5**: 1471, 1900.
10. Moore, Morris: Blastomycosis, Coccidioidal Granuloma and Paracoccidioidal Granuloma, Arch. Dermat. & Syph. **38**: 163 (Aug.) 1938.

In cases of dermatitis verrucosa or chromomycosis several organisms have been described. Lewis [11] quotes Carrión as stating that any of three fungi may be responsible: Hormodendrum pedrosoi, Hormodendrum compactum or Phialophora verrucosa, and he believes that they are generically related. Moore and Almeida,[12] who have studied the disease in South America, recognize as causative Acrotheca, Phialophora, Hormodendrum, and possibly Trichosporium. The species of Monilia usually pathogenic is Monilia albicans, although occasionally other species are apparently capable of causing disease. Torula histolytica, or Cryptococcus hominis, is the organism of so-called European blastomycosis. Sporotrichum schencki is the predominating cause of sporotrichosis in this country, although other species are sometimes pathogenic. Markley, Philpott and Weidman described a deep mycosis due to Scopulariopsis brevicaulis, the first such case in the American literature. Rhinosporidium seeberi, the etiologic agent of rhinosporidiosis, and Histoplasma capsulatum, of histoplasmosis, are organisms of increasing clinical importance. Most of these organism are described in table 3.

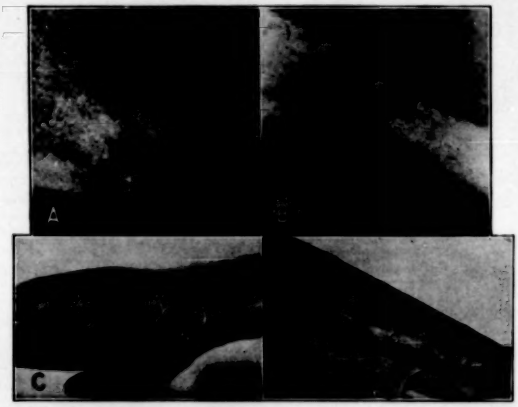

Fig. 5.—Four nonmycotic conditions which may closely simulate mycoses of the blastomycosis-like group: *A*, Ioderma, *B*, Micrococcus myeticus infection, *C*, tuberculosis verrucosa cutis, *D*, tertiary syphilis (simulating sporotrichosis).

IMMUNOLOGIC PHENOMENA

Various immunologic phenomena have been observed in several members of the blastomycosis-like group of diseases. The allergic eruptions usually referred to as "ids" have been seen associated with sporotrichosis, coccidioidomycosis and moniliasis. One would therefore expect to find them occasionally in other similar infections.

Positive complement fixation reactions have been obtained by various investigators in several of these mycoses, but the reactions are not sufficiently specific to be of diagnostic value. The same appears to be true of precipitation and agglutination reactions.

The local reactions to intracutaneous injections of specific fungous antigens appear to be of some aid in diagnosis and are worthy of further study. The reactions are of the tuberculin type, appearing in from twenty-four to forty-eight hours. A positive reaction to sporotrichin almost always occurs in sporotrichosis, although the reaction occasionally occurs in other mycoses as well. A negative reaction, according to Sulzberger,[13] speaks with a degree of certainty for the absence of sporotrichosis. In cases of coccidioidomycosis, Jacobson [14] and many others have found the cutaneous test with coccidioidin to be specific and of definite diagnostic value. On account of the many opportunities for sensitization to Monilia through oral, intestinal and intertriginous lesions, a positive reaction with oidiomycin is so common as to be of no aid in diagnosis. I have not found in the literature a satisfactory evaluation of the cutaneous reaction in Gilchrist's disease, torulosis or the rarer members of the blastomycosis-like group. With the exception of coccidioidomycosis in California, none of these diseases have occurred in large numbers in any locality. It is therefore difficult for any observer to compile enough case reports from which to evaluate these reactions. One can hope to do this only by combining the experiences of many observers. One is justified, therefore, in adding one's personal experience, even though it is not extensive.

It is now my practice to test patients with deep mycoses and suspected mycoses by means of several fungous antigens prepared from cultures in dextrose broth. In this way, although the reactions may not be absolutely specific, a comparative study of the degree of reaction to the several similarly prepared antigens should be of value. At present routine intradermal tests are being performed with coccidioidin, blastomycin and sporotrichin prepared in my office and with oidiomycin obtained from a biological manufacturer. Oidiomycin has been of no value but rather has served to obscure the issue because of the frequent positive reactions. Five cases of coccidioidal granuloma tested all showed a positive reaction to coccidioidin and no reaction to blastomycin. In one of these cases a test with sporotrichin gave negative results. One case of moniliasis showed a strong and persistent reaction to an autogenous antigen (Monilia nigra), no reaction to coccidioidin and a very slight and short-lived reaction to blastomycin. In 1 case of Gilchrist's disease only a moderately positive reaction was obtained with blastomycin and no reaction with coccidioidin or sporotrichin. One case of sporotrichosis showed repeated positive reactions to tests with sporotrichin and showed no reaction to coccidioidin or blastomycin. Most of these cases showed a positive reaction to oidiomycin. Experience indicates that persons with these diseases retain their capacity to react to their specific antigens for months or years after all clinical evidence of the disease has disappeared.

Judging from the experience of others, and from my own, it appears that coccidioidin, sporotrichin and probably blastomycin are of value in confirming or denying the presence of the corresponding diseases. In my

11. Lewis, G. M., and Hopper, Mary E.: An Introduction to Medical Mycology, Chicago, Yearbook Publishers, 1939, p. 154.
12. Moore, Morris, and Almeida, F.: Etiologic Agents of Chromomycosis of North and South America, Rev. di biol. e hyg. 6:94 (Dec.) 1935.
13. Sulzberger, M. B.: Dermatologic Allergy, Springfield, Ill., Charles Thomas, Publisher, 1940, p. 320.
14. Jacobson, H. P.: Fungous Diseases, Springfield, Ill., Charles C. Thomas, Publisher, 1932.

series the reaction to blastomycin was less definite than the others. A considerable number of control persons have been tested with these antigens and almost all have failed to react. Two persons have been tested, however, who gave positive reactions to several of the antigens and who had never had any evidence of any of these diseases. Both subjects were extremely sensitive to trichophytin. They were not sensitive to the ingredients of the broth from which the antigens were prepared or to the dilute phenol used as a preservative, and it is difficult to explain the positive reactions except on a basis of group fungous sensitivity.

many open sinuses there is so much pyogenic infection as to make the finding and isolation of fungi a difficult problem.

The so-called "pseudomycoses" may resemble the true mycoses. Indolent nodules, sinuses and ulcers caused by Micrococcus myceticus of Castellani [15] or Bacillus typhosus, and deep-seated, bruise-like nodules of Bacillus pyocyaneus, mentioned by Weidman,[16] belong to this group. I have seen 2 cases presenting deep infiltrations and sinuses due to Micrococcus myceticus which resembled sinuses of coccidioidal granuloma, although somewhat more acute in appearance.

TABLE 2.—*Clinical Pictures of Blastomycosis and Blastomycosis-like Infections*

Disease	Description	Prognosis as to Life
Blastomycosis	Infiltration with verrucous surface, miliary abscesses, ulceration	Good
Coccidioidomycosis	1. Acute pulmonary infection (valley fever)	1. Good
	2. Coccidioidal granuloma: Verrucous lesion with miliary abscesses; subcutaneous abscesses and sinuses; involvement of bones, joints and viscera (except intestinal tract)	2. High mortality
Paracoccidioidal granuloma	Purunculoid nodules beginning about the mouth; may be verrucous; extreme adenopathy resembling Hodgkin's disease; intestinal tract involved	Fatal
Chromomycosis	Elevated, verrucous, dark growths; mostly on legs	Good; does not usually become systemic
Moniliasis (deep)	Subcutaneous abscesses, ulcers, hyperkeratotic infiltration	Serious if systemic
Torulosis	Acneform pustules, granuloma-like ulcers, deep abscesses, subcutaneous nodules without ulceration, involvement of central nervous system	Grave except in cases of localized involvement
Sporotrichosis	Primary ulceration and nodules along lymphatics, disseminated nodules and ulcerations; occasionally visceral involvement	Usually good
Scopulariopsosis (deep)	Painful nodules	Good
Rhinosporidiosis	Pinkish polypoid masses beginning on nasal septum; skin involved by transplantation	Prone to recur unless destruction is thorough
Histoplasmosis	Intermittent fever, splenohepatomegaly, anemia, leukopenia	Fatal

TABLE 3.—*Description of Usual Organisms in Tissue and Culture*

Disease	Organism	Appearance in Tissue	Appearance in Culture
Blastomycosis	Blastomyces dermatitidis	Rounded, encapsulated cells, some with buds	Amount mycelium varies with medium; grouped, large round chlamydospores characteristic; mycelium septate; raquets
Coccidioidomycosis	Coccidioides immitis	Rounded, encapsulated cells, some with endospores	Coarse, septate mycelium, raquets, arthrospores and chlamydospores
Paracoccidioidal granuloma	Paracoccidioides brasiliensis	Rounded, encapsulated cells without distinct endospores, multiple small protoplasmic buds	Asci with spores inside and protruding; septate mycelium and chlamydospores
Chromomycosis	1. Phialophora verrucosa 2. Hormodendrum pedrosoi	1 and 2. Thick-walled, dark cells, some showing transverse fission; no buds	1. Septate mycelium, flask-shaped conidiophores; 2. Mycelium septate, conidiophores bearing branching chains of conidia
Moniliasis	Monilia albicans	Rounded, budding cells; hyphae may be present	Some mycelium, masses of conidia, chlamydospores; no asci
Torulosis	Torula histolytica	Large number rounded, encapsulated cells, some budding	Budding cells; no ascospores; no mycelium
Sporotrichosis	Sporotrichum schenckii	Small, round or elongated spores, difficult to demonstrate	Profuse, fine mycelium; pear-shaped, elongated spores in groups on short stalks
Scopulariopsosis	Scopulariopsis brevicaulis	Minute, encapsulated cells, difficult to identify	Septate, seldom branching, mycelium bearing long chains of conidia
Rhinosporidiosis	Rhinosporidium seeberi	Numerous, very large cystlike sporangia containing many spores	Not grown on artificial mediums
Histoplasmosis	Histoplasma capsulatum	Many very small cells with pale capsules, within endothelial and giant cells	Septate mycelium, conidia and chlamydospores; asci with ascospores and multiple tubercle-like buds

CONFUSION WITH NONMYCOTIC LESIONS

There are several nonmycotic conditions which are especially likely to mimic the diseases of this group of mycoses. A group of gummas extending in linear arrangement may closely simulate sporotrichosis. Ioderma and bromoderma at times give a picture similar to that of Gilchrist's disease, and when such a lesion occurs from iodide therapy in the course of blastomycosis or coccidioidal granuloma it is quite confusing. Tuberculosis verrucosa cutis usually has a dry verrucous surface, but in the presence of secondary pyogenic infection it somewhat resembles mycoses of this group. Sinuses extending to the surface from infections of bone and other deep structures are often difficult to differentiate from mycotic infection. In

PROGNOSIS

The prognoses of these diseases vary considerably. Blastomycosis of Gilchrist usually does not become systemic, although it occasionally does, with corresponding darkening of the outlook. A good many cases are responsive to iodides and roentgen therapy, although many cases are resistant to all known forms of therapy. With the acute pulmonary form of coccidioidomycosis the patient almost always recovers, but in coccidioidal granuloma the response to treatment is usually poor and the eventual mortality high. Jacobson,[17] however,

15. Castellani, Aldo: Pseudomycosis Due to Coccus: Micrococcus Myceticus, Arch. Dermat. & Syph. **18**: 857 (Dec.) 1928.
16. Weidman, F. D.: Cutaneous Torulosis, South. M. J. **26**: 851 (Oct.) 1933.
17. Jacobson, H. P.: Immunotherapy for Coccidioidal Granuloma, Arch. Dermat. & Syph. **40**: 521 (Oct.) 1939.

reported good results from intravenous injections of coccidioidin. Paracoccidioidal granuloma has the reputation of being a fatal disease. Chromomycosis, or chromoblastomycosis, usually remains localized, but Carrión [18] has reported a case presenting metastatic lesions. Whereas some of the American cases have responded to iodide therapy, Carrión's experience in Puerto Rico has been that they are difficult to cure. Moniliasis in systemic form offers a serious prognosis. Torulosis, since it usually sooner or later involves the central nervous system, is likely to be fatal. Sporotrichosis, if localized, usually responds to iodides; with deeper involvement the outcome is less certain. In the case of scopulariopsosis referred to, cure was brought about by iodides. Lesions of rhinosporidiosis must be thoroughly destroyed; otherwise they are prone to recur. Histoplasmosis, as far as I am able to ascertain, always results in death.

SUMMARY AND CONCLUSIONS

The clinical characteristics of blastomycosis of Gilchrist and the group of other mycoses in which yeast-like bodies are found are often not sufficient for diagnosis. In some forms of the group the microscopic appearance of the organism may be characteristic and diagnostic but in most cases the study of cultures is necessary. An accurate mycologic diagnosis is important in view of the different prognoses and the varying degrees of therapeutic response of infections by these different fungi, and for the purpose of adding new members to the list of possible pathogens. Intracutaneous tests with fungous antigens offer some assistance in diagnosis but must not be considered absolutely specific.

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ABSTRACT OF DISCUSSION

Dr. George M. Lewis, New York: Medical teachers appreciate the value of comparative studies of similar disease processes to bring out the salient features common to all. Since these fungous diseases are of uncommon occurrence, one is well advised to have clear mental pictures of the disease processes. Dr. Smith's work demonstrates the value of practical mycologic investigation that can be carried out by the practicing physician. I am in favor of grouping diseases when it is possible and believe it is justifiable to overlook the finer differences in strains of pathogenic fungi in order to correlate the clinical with the mycologic. As Dr. Smith mentioned, pooling of experiences is really necessary with the rare mycoses, since no one observer can hope to have a sufficiently broad personal experience to be of decisive value. In a case of blastomycosis in New York, there was sensitivity to an autogenous vaccine made from Blastomyces dermatitidis and this was thought to be specific, as other antigens failed to elicit comparable reactions. Of other fungous vaccines used in diagnosis, I believe trichophytin to be of value particularly in a negative way and when used in connection with cultural studies. Dr. Smith's results with oidiomycin coincide with the results which my associates and I have published, namely that oidiomycin is of no use as a diagnostic aid, since reactions following its administration are too frequent when there is no clinical history or evidence of moniliasis. The test often gives a negative reaction when the patient has an obvious monilia infection. We believe the manufacturers of the commercial product oidiomycin should withdraw the vaccine from the market since it is not of any importance in diagnosis. Its only use in our hands is as a control. Coccidioidin appears to elicit specific reactions, but it may be of limited diagnostic value in communities where the disease is endemic. Farness and Woolley demonstrate this in the Scientific Exhibit, in which they show that 90 per cent of school children in a district of California in which coccidioidomycosis is prevalent all gave a positive reaction to coccidioidin, showing that the test there would be entirely valueless. In New York State no case of coccidioidomycosis has yet been reported and in over three hundred tests with coccidioidin we failed to find a positive reactor.

Dr. Leslie M. Smith, El Paso, Texas: I have had no experience with thymol, sulfanilamide or sulfapyridine in the treatment of these mycoses. I have tried almost every other recommended method of treatment, and with many disappointments. Colloidal copper, colloidal iodine, iodides and antimony and potassium tartrate have all been used in my work with the mycoses of this group with varying results. In coccidioidal granuloma I have tried coccidioidin without result, although I have not yet used it intravenously as recently recommended by Jacobson.

18. Carrión, A. L.: Chromoblastomycosis in Puerto Rico, Puerto Rico J. Pub. Health & Trop. Med. 14:72 (Sept.) 1938

DISEASES OF THE COMMON BILE DUCT AND THEIR RELATION TO THE GASTROINTESTINAL TRACT

WITH SPECIAL REFERENCE TO THE ROLE OF CHRONIC PANCREATITIS

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It is my purpose in this paper to review briefly some of the common disorders affecting the biliary tract and to call special attention to the importance of the role played by chronic pancreatitis.

According to Walters and Snell [1] two types of chronic pancreatitis are recognized, the interlobular type and the interacinar type. Both are characterized by an increase in fibrous tissue, but in the former the islands of Langerhans are spared, while in the latter they are not.

In my experience neither hyperglycemia nor insufficiency of pancreatic secretion (as evidenced by bulky and fatty stools) need be present in cases of chronic pancreatitis that may yet be sufficiently severe to produce symptoms of obstruction of the common duct.

SYMPTOMS

The commonest symptoms of disease of the common bile duct are pain, nausea, vomiting and eructations of gas. Collectively these phenomena are usually called "indigestion" or dyspepsia. Jaundice may be an early or a late sign of biliary obstruction. Chills and fever suggest that infection of the biliary tract is present. In obstruction of the common duct acholic stools, a positive van den Bergh reaction and elevation of the icterus index help to complete the picture. When obstruction is complete or practically complete urobilinogen is absent from the urine.

Pain.—The severity of pain in diseases of the common bile duct varies. It is located usually in the epigastric and hypochondriac regions. Pain may be referred to the back, shoulder, right iliac region and transversely across the umbilical line. The severity of the pain may sometimes aid in the diagnosis of the lesion causing obstruction to the common duct. It is severe when a stone is passing through the common duct, but the severest pain of all is that which accompanies obstruction

From the Services of the Jewish and Mount Sinai hospitals.
Read before the Section on Gastro-Enterology and Proctology at the Ninety-First Annual Session of the American Medical Association, New York, June 14, 1940.

1. Walters, Waltman, and Snell, A. M.: Diseases of the Gallbladder and Bile Ducts, Philadelphia, W. B. Saunders Company, 1940.

due to the swelling and inflammation caused by acute hemorrhagic pancreatitis. Pain due to chronic pancreatitis varies, depending on the extent and location of the disease. Attacks of colic attributable to pancreatitis are similar to those accompanying the passage of a stone in the common duct, but pain referred transversely across the umbilical line should make one suspicious of pancreatic disease.

Nausea and Vomiting.—Reflexly nausea and vomiting accompany all the disturbances referable to the bile passageways. These symptoms, together with pain, are universally present. Nausea and vomiting are rarely persistent, but the phenomena may be repeated if the cause is not removed. In patients who have been ill a long time from disease involving the bile passageways and the pancreas, nausea and vomiting may recur at intervals of a few hours or on several successive days. Fatty foods are usually not well tolerated by those having disease of the biliary tract.

Jaundice.—Jaundice due to stones in the common duct constitutes, in general, the painful type, while obstruction due to cancer of the head of the pancreas and the papilla of Vater usually gives rise to no pain. When accompanied by pain, jaundice is usually secondary to stones in the common duct, and when impaction of a stone at the papilla of Vater occurs jaundice is intense. On the other hand, I have seen the common duct practically packed with stones which did not cause jaundice. The so-called ball valve stone gives rise to alternating jaundice

Fig. 1.—The gallbladder did not concentrate the dye. Chronic pancreatitis was revealed, for which cholecystogastrostomy was performed.

Jaundice may appear after attacks of pain due to chronic pancreatitis but is more often absent. The following case illustrates this:

A. B., a woman aged 49, was admitted to the Jewish Hospital March 6, 1940 complaining of frequent epigastric colic and pain in the right upper quadrant of the abdomen. Nausea and vomiting were present. She was operated on, and no stones were found in the gallbladder or common duct. The pancreas was exceedingly hard. Notwithstanding this hard pancreas and its intermittent obstruction to the flow of bile there was absolutely no jaundice. A cholecystogastrostomy was performed. The immediate effect of the operation was magical. She has been entirely symptom free ever since.

Jaundice accompanying chronic pancreatitis gives a mild tinge of yellowishness, but that due to stones or

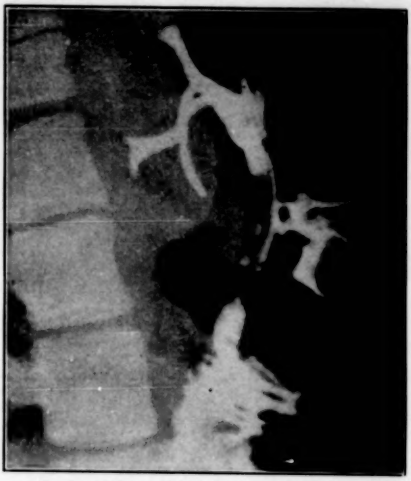

Fig. 2.—Choledochogram illustrating T tube and patulous papilla of Vater. Lateral view.

a new growth at the head of the pancreas causes intense yellowish discoloration of the skin. The gallbladder is not distended in benign obstructions. The icterus index will be of some assistance because it is lower in patients suffering from chronic pancreatitis than in those in whom a complete obstruction is found.

Jaundice, if allowed to continue, produces degenerative changes in the entire organism, but especially in the heart, liver and blood. The surgeon should therefore operate to remedy the cause of obstruction within two to four weeks of its onset. Jaundice accompanied by fever, with or without chills, signifies infection of the biliary system and is usually due to suppurative cholangitis. Most commonly this occurs in the presence of stones of the common duct, but occasionally no stones are found. The following case illustrates suppurative cholangitis without stones:

F. M., a woman aged 33, was admitted to the Jewish Hospital March 28, 1940. Two days before admission she had had acute pain in the right upper quadrant of the abdomen with repeated episodes of vomiting. This attack occurred just before breakfast. Later in the day she became jaundiced and nausea continued. There was a history of a similar attack thirteen years previously. Fever and a slight chill accompanied the symptoms. She was operated on four days after admission. The common duct was opened, and a large amount of greenish purulent material exuded. No stones were found in the common duct but there were three large stones in the gallbladder. Cholecystectomy was performed, and a T tube was inserted in the common duct, which was irrigated daily with salt solution. Before the patient left the hospital a choledochogram was made, and the papilla of Vater was found patulous. Iodized oil entered the duodenum.

Today physicians approach operations on the biliary passageways in the presence of jaundice with greater confidence as a result of the introduction of vitamin K. Ability to estimate the prothrombin time preoperatively and postoperatively has been a boon to the physician and the patient. The protection of the patient from

Fig. 3.—Immediate repair of common duct after an injury sustained in the performance of a cholecystectomy. Line of suture covered with omentum.

secondary hemorrhage after operations on the biliary passages is now practically assured by the administration of vitamin K and bile salts before and after operation. The recent introduction of a vitamin K product which may be used intravenously obviates the need for the coadministration of bile salts.

Benign versus Malignant Obstruction.—The main sign which aids in the differentiation of gallbladder disease from disease of the common duct is jaundice. Jaundice is nearly always present in obstruction of the common duct and absent in cholelithiasis unless (rarely) the pressure of stones in the gallbladder is great enough to cause blockage of bile passing through the common duct.

When a stone obstructs the cystic duct the gallbladder is enlarged and palpable. It may be felt as a pyriform mass in the right hypochondriac region. If a stone obstructs the common duct in the region of the papilla of Vater, the common duct is dilated, and if infection supervenes Charcot's fever manifests itself. When painless jaundice is present a malignant condition at the head of the pancreas or the papilla of Vater must be suspected. The gallbladder is greatly distended and can easily be felt in the right hypochondriac region. The physical signs will follow the well known law of Courvoisier. It does not always follow, however, that carcinoma of the papilla of Vater or of the head of the pancreas results in distention of the gallbladder. In several cases I have been prepared to perform the Whipple operation for carcinoma at the head of the pancreas, but the gallbladder was small and shriveled and contained impacted stones. Nor should operation ever be deferred in cases in which jaundice is painless in the belief that such jaundice is always secondary to cancer.

Chronic Pancreatitis and Obstruction of the Common Duct.—It is sometimes practically impossible before operation to differentiate between the symptoms due to gallbladder disease, choledocholithiasis and chronic pancreatitis. At operation it requires considerable experience to differentiate between the grades of firmness and hardness of the pancreas. The pancreas should be palpated in all operations whenever such palpation is possible, so that one becomes familiar with its normal structure. Chronic pancreatitis must always be suspected when stones are absent from the gallbladder or common duct. Cholecystography may or may not be of positive value in such cases. The roentgenogram may be interpreted as showing evidence of gallbladder disease or even of cholelithiasis, but operation fails to confirm the findings (fig. 1). When the radiologist reports there is no disturbance of gallbladder function after the dye test, despite otherwise suggestive symptoms, chronic pancreatitis must be suspected. The only positive method of differentiation between stones in the common duct and chronic pancreatitis must be operation.

OPERATIONS

The operations performed on the common duct for benign conditions are those done for the removal of stones, obstruction due to stricture of the duct or

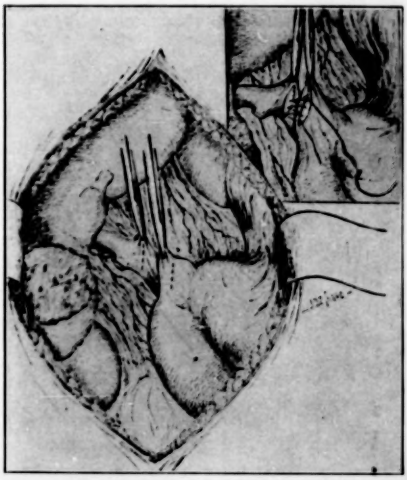

Fig. 4.—Anastomosis of common duct to duodenum. Same technic is used in performing choledochogastrostomy.

destruction of the duct by an error in technic in the removal of the gallbladder. Many unnecessary secondary operations can be avoided if the common duct is explored when the operation of cholecystectomy for cholelithiasis is performed. Of the 125 patients with obstruction of the common duct that I have operated on 20 per cent had choledocholithiasis.

Multiple operations on the common duct have been performed in several patients in whom there was a recurrence of stones. The following was a typical example:

B. S., a woman aged 55, was admitted to the Mount Sinai Hospital Nov. 17, 1938. Twelve years after cholecystectomy this patient returned with symptoms referable to gallstone colic with jaundice. She had recurrent attacks of pain. Operation was performed on the common duct. A ball valve stone was removed and a T tube was inserted. Ten days later the choledochogram showed that iodized poppyseed oil did not enter the duodenum. On Feb. 10, 1939 a second operation was performed, and at that time two soft stones were removed. The second choledochogram showed that the iodized oil entered the duodenum. The T tube was removed sixteen days after the second operation.

After all common duct operations for choledocholithiasis the T tube is used for external drainage. The T tube may remain from two weeks to six months or even a year, depending on the condition for which the patient was operated on. In cases of recurrent choledocholithiasis it is important that the T tube remain for months and be irrigated daily with salt solution. No T tube is removed unless a choledochogram has been made to determine the patulousness of the duct and the papilla of Vater (fig. 2).

Strictures of the common duct are due mainly to injury in the performance of the operation of cholecystectomy. In a few cases strictures are found without a history of previous operation. Such strictures probably occur on an inflammatory basis. Accidents to the common duct can be reduced to a minimum if proper consideration is given to anatomic relations in the region of the foramen of Winslow. Plastic operations on the duct are usually necessary to correct the results of such accidents. When transverse section of the common duct is detected at operation, immediate repair gives the best results (fig. 3). As an example of this the following case is cited:

R. H. B., a woman aged 34, was admitted to the Jewish Hospital July 1, 1937. There was pain in the right upper quadrant of the abdomen of six weeks' duration. She had had repeated attacks accompanied by nausea and vomiting. Mild diarrhea was present every day. Cholecystography revealed a diseased gallbladder. She came to operation on July 3, 1937, and stones were found in the gallbladder and in the common and hepatic ducts. During cholecystectomy the common duct was cut almost completely across. The error was discovered immediately. An end to end anastomosis was performed and a piece of omentum placed over the line of suture. The patient made an uneventful recovery, with the exception that a small secondary collection had to be opened fourteen days after operation. The patient is still well and has suffered absolutely no inconvenience as a result of the accident because an immediate repair was made.

Operations for Chronic Pancreatitis.—Years ago when a diagnosis of chronic pancreatitis was made external drainage operations were common. It required considerable effort on the part of some surgeons who were interested in surgery of the biliary tract to convince their colleagues that an anastomosis of the gallbladder to the stomach or duodenum was preferable to that of a cholecystostomy or choledochostomy (fig. 4).

Drainage of bile from the latter operations often continued for months as a result of unrelieved obstruction at the papilla of Vater due to pancreatitis. While anastomotic operations are more difficult to perform it was soon recognized that they were efficient and curative. Patients in whom recurrent colic without stones exists should never have the gallbladder removed.

As an illustration I report the following case:

L. S. L., a man aged 32, was admitted to the Jewish Hospital April 6, 1940. He stated that for six years he had had heartburn, palpitation and pain in the right upper quadrant of the abdomen. A roentgenogram taken in Germany six years before was interpreted as showing stones in the gallbladder. The patient arrived recently in this country and received continuous medical care without relief. He was operated on two days after admission to the hospital. No stones were found, but a hard pancreas was revealed. Instead of removal of the gallbladder a cholecystogastrostomy was performed, and, in addition, an appendectomy. The operation relieved him immediately from the daily pain which he had suffered.

This is one type of patient who will certainly have a recurrence of symptoms after cholecystectomy. Frequently such patients are subsequently classified as persons with neurasthenia. Some of them doubtless swell the ranks of those who continue to suffer after a noncalculous gallbladder has been removed for suspected gallbladder disease. Cholecystectomy in such cases may rob the patient of his best chance for symptomatic relief.

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ABSTRACT OF DISCUSSION

DR. MAX THOREK, Chicago: There are still many weighty problems to be solved in the pathology and therapy of gallbladder disease. Much has been done in illuminating some paths which have been obscure, but there still are many problems which will be solved by constant cooperation among the clinician, the physiologist and the surgeon. From the etiologic point of view much attention should be paid to regurgitation of pancreatic juice into the gallbladder. The study of this subject has opened new avenues of approach which promise to yield good results. Dr. Behrend's observations on stones in the common duct are timely. The pendulum of opinion as to whether the common duct should be explored routinely is swinging back and forth. Hazards in operative procedure have been lowered by properly administered spinal anesthesia and should be resorted to more frequently but only under ideal conditions. The treatment of impacted stones in the common duct, particularly in the retroduodenal and ampullar portions, still remains a difficult surgical entity. The surgical division of strictures of the common duct low down is still an experimental procedure. The best way to treat injuries to the common duct is not to permit the common duct to be injured. I wish to recall Flint's aphorism on the great frequency of abnormalities in the distribution of the extrahepatic biliary passages and blood vessels. If one will keep this frequency constantly in mind and couple it with the fact that Hartmann's pouch often obscures, by enlargement and descent, the cystic duct, and if one will meticulously uncover the duct by pulling the pouch upward before proceeding to ligate it many injuries to the common duct will thus be avoided.

DR. JULIUS FRIEDENWALD, Baltimore: It is well recognized that the management of cholecystic disease is by no means always satisfactory, largely because the exact etiology of this disease is frequently difficult to establish. Although infection, biliary stasis and metabolic disease play an important role in the production of this disease yet the relationship of these various factors and their relative importance is far from clear and requires further study. On this account any additional evidence which may aid in clearing up this problem must be of value in leading to a more successful management of cholecystic disease. The Graham method of visualization of the gallbladder is of the greatest value in the diagnosis of cholecystic disease, but its limitations must constantly be borne in mind. While it presents evidence as to the contractility, concentrating power and deformity of the gallbladder as well as to the patency of the cystic duct, most important as these are, they are ordinarily indications of advanced pathologic conditions which often require surgical intervention. It does not, however, offer any information as to early cholecystitis—that

is, as to mucosal changes occurring at an early stage, evidence of which is usually obtained by means of biliary drainages, and thus at a period when medical measures are most effective; on the other hand, it may happen that the cholecystogram may be definitely positive for gallbladder disease, as is indicated by nonfilling, and yet normal conditions be revealed at operation. A number of such instances have occurred in my experience. It has been suggested in some of these cases that nonfilling may be due to disturbances outside the gallbladder, as, for instance, pyloric obstruction, duodenal ulcer or inflammatory involvement of the small bowel associated with diarrhea. It is important in formulating the therapeutic measures to be followed in cholecystic disease that one should not rely on the cholecystographic findings alone, although these are most valuable, but that these must be evaluated in relation to the history, physical findings, laboratory studies and biliary drainages. It is only in this way that the most satisfactory results can be expected.

DR. S. ALLEN WILKINSON JR., Boston: The author calls attention to a number of diseases of the common bile duct and to the relationship of chronic pancreatitis to this disease. I wish to mention a diagnostic procedure not discussed by Dr. Behrend which I have found of great advantage in the differential diagnosis of disease of the common duct, namely duodenal drainage. This is particularly true where a cholecystectomy has previously been done for gallstones and where the clinical history following the cholecystectomy may point either to cholangitis, coincident chronic pancreatitis or to stones of the common duct. These stones of the common duct may be either recurrent stones or ones left in at the time of the original operation. The history given by the patient is probably the most important single factor in this differentiation, but no other laboratory test except duodenal drainage offers any positive means of differentiation. When one examines the bile obtained from a drain, the presence of calcium bilirubin pigment and of cholesterol crystals almost invariably indicates the presence of stones. The author recommends a cholecystogastrostomy in cases of pancreatitis where the gallbladder is intact. I have seen a number of cases in which cholecystogastrostomy has been performed, followed by severe and disabling cholangitis produced by regurgitation of food into the gallbladder and thence into the biliary tract. For this reason I have given up cholecystogastrostomy and prefer to anastomose the gallbladder to the jejunum. By pulling up a loop of the jejunum the anastomosis is easy. It is made to a structure approximately similar in size and contour, and there is no tendency of the anastomosis to pull apart if the jejunum is anchored to the capsule of the liver. Physiologically, the effect is much better to introduce the bile into the jejunum rather than into the stomach, and the distressing postoperative nausea which some patients on whom anastomosis has been done is avoided. I am in agreement with Dr. Behrend when he condemns the practice of removing gallbladders which appear normal at operation and can go one step further and condemn equally heartily the practice of removing gallbladders which preoperatively may show a faint filling with the gallbladder dye or an incomplete emptying. There is no type of surgical procedure in which the end results after operation are poorer than they are after the removal of the noncalculous gallbladder for so-called chronic cholecystitis.

DR. HENRY A. RAFSKY, New York: Any classification which is of help should be utilized, but the problem in disease of the biliary tract is that many cases are encountered which are by no means typical. The patients most often relieved by cholecystectomy are those with calculous cholecystitis associated with attacks of biliary colic and to a lesser extent patients with noncalculous cholecystitis with severe abdominal pain. The use of microscopic examination of bile as a diagnostic and therapeutic guide should be emphasized. If we find a shower of cholesterol crystals combined with calcium bilirubin pigment in the duodenal contents we can be fairly certain that we are dealing with active disease of the biliary tract. I wish to carry this point one step further and stress the clinical importance of looking for crystalline elements in the gastric contents, which can be performed routinely and is a comparatively simple procedure. Regarding a fall of the cholesterol esters below 70 per cent or a rise of the free cholesterol above 30 per cent as indicative of liver damage, I have found that the determination of the cholesterol partition serves as a good prognostic guide. Since using this test as a routine procedure before gallbladder operations for the past two years and guiding myself accordingly, I have not encountered a so-called liver death. This, I think, is more than a coincidental observation.

DR. A. F. ANDRESEN, Brooklyn: There are several points that should be emphasized, points that might be lost in the general discussions. There has been for a long time a feeling on the part of roentgenologists and surgeons that a lack of filling of the gallbladder indicates surgical intervention, and I think it was brought out nicely this morning that it should not be so considered. Many useless operations have been performed because of this misconception. In addition to the causes for nonfilling of the gallbladder with the dye which have been enumerated this morning and with which I agree, the most common reason is an insufficient stimulation to evacuation of the biliary tract occasioned by an inadequate diet. A patient with gastrointestinal symptoms may take insufficient amounts of food (especially fats) at insufficiently frequent intervals for considerable periods of time, and the resulting biliary stasis may cause so much concentration of bile in the gallbladder that the dye cannot permeate it or even enter the gallbladder. Promoting biliary drainage by a few weeks of frequent feedings containing adequate amounts of fat will often result in a beautiful filling of the gallbladder and may then demonstrate a normal gallbladder or one containing calculi. I am also glad that the speakers emphasized the need of fat in the diet. I have been trying for more than twenty years to convince people that fat has a necessary part in a gallbladder diet, and I am glad to see that gradually my idea is being adopted. One other point impressed itself on me in looking at one of the tables on the screen, and that was the emphasis on the old fallacy that painless jaundice indicates pancreatic carcinoma or, conversely, that pancreatic carcinoma is associated with painless jaundice. In an analysis of 40 patients made in our clinic recently, 60 per cent of them had pain and many severe pain in the midepigastrium or on one side or the other. We must not insist on painless jaundice to make a diagnosis of carcinoma at the head of the pancreas.

DR. MOSES BEHREND, Philadelphia: I must agree with Dr. Thorek concerning the injection of ether through the T tube to dissolve stones that have formed in the common duct, and the administration of amyl nitrite to relax the sphincter of Oddi. We, too, have not had much success with this treatment. All the patients on whom we tried it have had to be reoperated on. I can't agree with Dr. Thorek in regard to statistics. Twenty years ago I did a lot of anatomic research in this field and found 25 per cent of anomalies existed in the blood vessels and the ducts connected with the gallbladder tract. I agree with Dr. Wilkinson concerning duodenal drainage where the gallbladder has been removed. It is important to perform gallbladder drainage to determine whether new stones have formed in the common duct, even when the gallbladder has not been removed. The microscopic test of the presence of cholesterol crystals and pigment has given 100 per cent positive diagnoses. In this respect it has been a little bit better than the roentgen examination. I advocated many years ago that anastomosis of the gallbladder to the duodenum was much more preferable to anastomosis of the gallbladder to the stomach. I am sorry if I conveyed the feeling that I prefer cholecystogastrostomy to cholecystoduodenostomy. I do not believe that the danger is greater if the gallbladder is attached to the stomach than if it is attached to the duodenum or the jejunum. We have not performed a cholecystojejunostomy up to the present time. I am glad to hear the discussion concerning these two viscera and I hope in the future to use this method of anastomosis. The same dangers, however, may exist in hooking up the gallbladder to the jejunum as in the operation of cholecystogastrostomy and cholecystoduodenostomy.

SHOULD CORONARY DISEASE AND HYPERTENSION BE A CAUSE FOR REJECTION IN INDUSTRY?

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The answer to the highly controversial question "Should coronary disease and hypertension be a cause for rejection in industry?" depends to a great extent on who is asked—the injured worker, the employer, the trade union, the insurance carrier or the industrial physician. These are the people primarily involved in the solution of one of the most frequent yet most complicated problems confronting the student of industrial medicine. I use the word "student" because I know of no other pathologic problem in this specialty requiring more careful study in each individual case if the problem is at all concerned with industrial liability.

High in morbidity and highest in mortality, heart disease is the most expensive illness. More than a fifth of cardiac disorders occurs in persons under the age of 40, and it costs this country $250,000,000 a year in lost wages, in addition to the cost of physical and financial dependence of persons with these disorders on the community and on industry. Furthermore, heart disease has a depressing and disintegrating effect within the family in which it occurs.

The compensation law of California specifically renders industry liable for "injuries arising out of or in the course of employment." High courts in other states have repeatedly decided that even a cardiac accident arising in the usual course of employment is compensable. Of the five interested parties mentioned previously the first four are inherently prejudiced from the start; therefore the physician qualified to review cases of cardiac disability in industry must be honest in order to be fair to all parties; he must be scientific to be thorough, in that he must have sound physiologic understanding of each case before he can come to a rational conclusion. The worker disabled by heart disease too often, but naturally, ascribes it to trauma or activity in his occupation. The employer is interested in efficiency, regular hours, speed and mass production. The trade union is concerned with the care and protection of its members. The insurance carrier wants to appease its assured yet show a profit for its stockholders without raising the employer's premium. Into this situation walks the physician employed by any of the previously mentioned parties to render an opinion or give expert testimony before a referee, judge or jury. The less said about the present status of so-called expert testimony, the better; what is needed is the creation of standards for qualification, to be defined and approved by physicians in each specialty in medicine.

The answer, then, to the question of industry's true course in the rejection of workers with heart disease and those in the hypertensive state can lie only in the merits of each such worker. Moreover, the answer rests on whether or not the applicant is applying for his first job with an employer or whether he has become disabled during the course of employment and reapplies for his job.

To any one with experience in the field of industrial medicine it is utterly absurd, and unfair to all concerned, to attempt any blanket rejection of men willing to work just because they have cardiac or circulatory disorders. There's a job for the man and a man for the job, without detriment to either.

Consider the applicant for work who desires his first job with an employer. His case is simply and easily handled. If on thorough examination the man is found to have heart disease or circulatory hypertension, his acceptance or rejection should depend solely on whether the work he is to do will increase that disorder or whether the disorder will reduce his efficiency in that job. If either of these factors exists, rejection is warranted and is logical and best for all concerned. The disposition of such rejections will be mentioned later.

On the other hand, rejection or reemployment of the worker disabled on his job is a problem of great magnitude, the solution of which rests on many interrelated factors. To me the answer is plain. Rejection or acceptance should depend on the data obtained from a scientific and comprehensive study of each case. With this, then, as my premise, let me briefly but factually state the underlying mechanisms concerned in the production or exacerbation of heart disease and hypertension, on which, in turn, rejection hinges. But first a warning is in order. The physician in attendance must not assume the point of view of the private practitioner. In the latter's study of a patient there always lurks an automatic consideration of heredity, environment, family history, habits, character and other factors which determine one's longevity. In industrial medicine these things are not forgotten, but the law reads that the worker is entitled to compensation for "injuries arising out of and during the course of employment." The referee, judge and jury are little concerned in the physician's knowledge of the injured worker's family history, his background, stamina or stability, which are potent factors in health and disease. They want to know "Was or was not this man's illness, disability or death a result of the work he was doing?" Most workers are not physically examined before employment; if they are, a signed waiver on physical defects does not always legally protect the employer. Remember that even the exacerbation of a preexisting illness gives the worker (as well as dependents of the deceased) the same benefits and rights as if the work created the disease state. This is manifestly unfair, but it is the existing law, at least in unionized California, land of the three bridges.

Consider, then, what progression of events in an occupation could create coronary disorders and hypertension or exacerbate them to the point where industry would be called on to prove or disprove its responsibility. To do that physicians must proceed to fundamental physiologic facts enabling them to render a rational, scientific opinion. My own views are based on experience in such cases and on the conclusions reached from animal experimentation. I firmly believe that industry has not been held liable for cardiac disorders and hypertension in a vast number of instances in which it has been partially or wholly at fault. The majority of medical opinion rendered in California is against industrial liability.

Next, I feel industry should not be held liable for coronary and vascular accidents occurring when a worker is performing the usual routine activities of his job, with no unusual effort or exertion or trauma. In that case, one rightfully feels the disorder was approaching and the inevitable symptoms and signs were soon to appear regardless of the worker's activities. However, when a worker's heart disease arises from his

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being subjected to trauma or activity bringing extraordinary or unusual effort in the course of his work it is difficult to see how his claim for compensation can be dismissed and his disease classed as of nonindustrial origin without a comprehensive examination; and these are my reasons for such an opinion:

The coronary system is practically the only supply of blood to the heart muscle. The heart's ability to increase its work depends on the oxygen supply. The minute anoxemia enters the picture the heart begins to fail. Heart failure is more pronounced in the hypertensive state, valvular disease and aortic abnormalities. The coronary blood flow depends on three factors: (1) aortic pressure, (2) mechanical resistance in the myocardium and (3) the caliber of the coronary vessels.

Arterial hypertension causes heart strain; it places a burden on the left ventricle, which develops the head of pressure for coronary flow. This ventricle can carry tremendous loads for years, but when it is partially anoxic its failure begins. When this occurs, however, in the right side of the heart there is far less ability of the right ventricle to carry on, with much faster failure when the pulmonary arterial pressure is increased. The speed and degree of failure, therefore, will depend on the unusual effort the heart is subjected to. Heart failure due to unusual effort is the more common type of acute or chronic myocardial failure. It is often produced in occupations which suddenly demand more exertion than the heart muscle can supply.

Now appears the question of industrial liability for death from coronary thrombi. Too often have I heard testimony to the effect that "Well, occlusion of this man's coronary vessels would have occurred soon, regardless of his work." It is true that the majority of published opinions have reported most coronary failures occur while the patient is at rest or asleep. But do not forget that hours to days usually elapse between the inception of a thrombus and its movement to occlusion. What right have physicians to say that inception took place at rest rather than at work, or that after inception the ensuing work did not speed up or increase the severity of the occlusion? After all, if a man labors five days at eight hours a day he is working forty out of a hundred and sixty-eight hours, which is less than a fourth of his week. Therefore his chances are three to one of having his attack when he's not working; but this fact provides no logical basis for excusing industry, for the hour of inception of a thrombus is all important.

Physical exertion and emotional states promote formation of thrombi, with resulting disaster. Again let me stress that if exertion has been the kind to which a worker has been usually exposed one should ascribe death to natural causes, but any degree beyond the usual, or exposure to toxic substances, temperature changes or oxygen deficiency warrants investigation of all circumstances when a cardiac accident occurs. Such an investigation must cover the period of time from the attack to a time at least a week previous to it.

Likewise, both physical exertion and highly emotional states produce hypertension of varying duration. Thus high intracapillary pressure is produced. In the presence of marked sclerosis or other forms of circulatory degeneration the capillary vessels are prone to give way, with resulting hemorrhage which, if large enough, becomes a damaging infarct. Various observers have found severe physical exertion raises blood pressure from 100 to 180 mm. of mercury. If the rupturing capillary in itself does not produce interference in function, it initiates a train of events leading to future trouble.

Trauma of various kinds may also produce coronary closure, infarction and angina pectoris. I regret space does not permit the review of interesting and conclusive evidence. Penetrating and nonpenetrating blows to the chest and back have produced clearcut coronary disorders, the mechanism of production being due to vessel spasm. This may be transient, with little or no aftereffects, or it may produce ischemia long enough to cause serious trouble. In workers buried in falling earth, increased intravascular pressure develops. Congenital defects may allow ordinary exertion but not unusual.

In other words, anything increasing the load of an inadequate heart muscle tends to produce heart failure, whether it be through coronary occlusion, spasm, rupture or aneurysm. Death may result from acute dilatation, as in electric shock, exposure to cold water and freezing temperatures. In the last war physicians saw the "nervous heart" with pain due to fatigue from persistent rapid beat. A worker with severe anemia cannot always respond to excess exertion without cardiac symptoms; in wounded patients the heart is affected by histamine shock; in those with burns, where blood is concentrated, there is diminished volume; in patients suffering hemorrhage there is an increased rate; in those with heatstroke death appears to occur from hemorrhage under the endocardium of the left ventricle. A heightened metabolism belabors the heart; diabetes accelerates sclerosis, and obesity accelerates coronary disease. A gain of 30 pounds (13.6 Kg.) in weight adds nearly 20 miles of blood vessels to our vascular system.

If the cardiac output is increased a rising blood pressure increases coronary flow, thus subjecting the diseased vessel to rupture if the dilating response to epinephrine is insufficient. Also, increased cardiac output (per beat) tends to tear débris from diseased valves as blood passes through, surging into the coronary openings of the aorta or into the general circulation. On the other hand, exertion may increase the circulatory rate without increasing the heart's output; then coronary pressure tends to fall and patients are in trouble, not from hemorrhage, but from anoxemia or clotting. Reversely, anoxemia in excess is a potent coronary vessel dilator. Why can't such dilatation in an atheromatous vessel be dangerous? Also an abrupt increase in the work of the heart or sudden lowering of pressure in the aorta starts a vicious circle which may result in coronary insufficiency. The resulting anoxemia causes a rapid circulatory rate resulting in an increase in the size of the right ventricle to a point where the all or none law does not apply—an increase leading to edema of the lungs; it is known that the right ventricle hasn't the reserve strength of the left one.

Moreover, body tissues and chemistry play a major role. On tissue metabolism depend the rate and volume output of the heart, which is merely an agent. The oxygen and carbon dioxide pressure, together with the hydrogen ion concentration in the capillaries, is the determining factor. During muscular work the circulation rate is considerably increased, both from the chemical side and from the fact that excessive breathing brings about a failure in circulation. Work increases oxygen consumption; when there isn't enough oxygen, through inability of the heart to produce it, the ensuing asphyxia impairs the action of the heart. Excess respiratory activity can cause shock, as forced breathing diminishes the circulation. This is particularly true in

the brain, which has a rich blood supply for its gray matter. Its normal oxygen pressure is very high; during muscular activity oxygen diminishes and carbon dioxide increases because of the venous blood from the muscles. The role of excess lactic acid formation is questionable. It is known, however, that when tissues are poorly supplied with blood unoxidized lactic acid accumulates in them and passes thence into the blood stream, raising the hydrogen ion and carbon dioxide concentration of the blood and followed by stimulation of the respiratory center.

Thus it can be seen that any factor producing even mild failure of the heart embraces multiple and complex changes in the whole circulatory system.

SUMMARY AND CONCLUSIONS

Augmented work increases oxygen consumption. When the entire heart is confronted with a general lack of oxygen the result is the picture of congestive failure; when there is a local lack of oxygen in the myocardium the result is angina pectoris, if mild, and infarction, if severe. The normal heart is usually able to meet the load placed on it by industry; there are few exceptions. Persons with abnormal hearts, circulatory hypertension and vascular diseases sometimes fulfil the demands made on them for a lifetime of activity but more often tend to fail eventually from even the routine activities and frequently fail when extraordinary activity is demanded. The presence of systemic disease is detrimental to normal circulatory function. Cardiac failure is in direct ratio to oxygen want. Exertion, disease and emotional states cause hypertension, which is usually a forerunner of coronary disease. The mechanism of production of coronary disease and hypertension has been reviewed in the light of their relation to industry.

Industry should reject workers with coronary disease and hypertension only when the work contemplated is clearly destined to exceed their ability to respond normally. Industry should accept responsibility for the pathologic conditions it has created or exacerbated. Industry and unions should cooperate by allotting work within the ability of the worker with heart disease, because 70 per cent of those rejected are able to work at something. Differentiation between ordinary and extraordinary activity is difficult but possible.

In conclusion I offer the following thoughts toward solution of this controversial subject:

1. Institute preemployment examinations with the right of the worker to sign a waiver which the law will recognize, thus acquainting the worker with his disabilities while protecting the employer.

2. In cases of questionable liability for cardiac disorders arising out of employment, demand careful medical analysis of each case by a competent examiner, who will painstakingly start his investigation not just from the time of onset of apparent disability but from a period many days previous thereto.

3. Establish wider use of electrocardiography, the value of which often exceeds that of the widely used roentgenography.

4. Amend the present industrial laws to allow finer gradations and degrees of incapacity.

5. Abolish the unfair laws extant in many states where a worker's death gives dependents full award when death has been due only to exacerbation of admitted, preexisting disease. Industry should rightfully reject a claim for full death benefits in the rupturing of an old syphilitic aneurysm at work which would have ruptured soon without any exertion; at present there is little or no allocation of degree of responsibility. In California now the award is $6,000 net.

6. Give the disabled worker prompt and proper medical care; rehabilitate him. Don't discard him, but develop him, and work with placement and rehabilitation bureaus which find work for disabled persons in skilled and unskilled labor.

7. Define more clearly in each state which occupational diseases are compensable and to what degree. As proposed by Robert T. Legge, create legislation enabling the person with heart disease to work under medical supervision yet releasing the employer and insurance carrier from financial liability in case of death.

8. At present, expert medical testimony is in a deplorable state. Create and define standards of qualification and urge their acceptance by commissions and courts.

9. Teach more industrial medicine in the nation's medical schools.

10. Create state medical boards of review which should decide which cases are worthy of consideration by commissions and courts. Such boards would eliminate many evils of the present system of decisions by lay referees, whose honest intentions are often buried in a mass of conflicting medical testimony.

Lastly, the principals must get together; the worker, the union, the employer, the insurer and the physician all have something to learn from one another.

That is my answer to the question before me. It cannot be a sweeping, conclusive one because it depends on the merits of the worker in each individual case.

This answer is a challenge to the industrial physician, especially when, with the vast defense program of the United States imminent, there will soon be a chance to place every available person. It is one I know will be met successfully to provide another brilliant chapter in the annals of American medicine.

450 Sutter Street.

ABSTRACT OF DISCUSSION

DR. NELSON D. MORRIS, Toledo, Ohio: I agree with Dr. Behneman that present knowledge does not warrant widespread rejection of workers for hypertensive or coronary disease. Adoption of such practice to protect the employer would implicitly force him to accept undue liability for those not rejected. Errors in courts or in legislative chambers in assigning undue risks to industry in re health of employees should not be allowed to stampede us into a false position. We have two important responsibilities: first, to safeguard and maintain health; second, to assist in determining causes in which injury attends occupation. Our first duty is performed by careful history taking, physical and laboratory examinations, reasonable effort to suit the task to the worker's capacity and continued supervision to find where we may be wrong, where physical status may change or where the conditions of labor may be improved. Industrial medicine so practiced aims to benefit every one through benefits conferred directly on the worker. It has no purpose to protect the employer from health risk except by keeping workers with known physical impairment from tasks of extra hazard and reducing those hazards wherever possible. The discharge of our second responsibility should not be confused by efforts to favor the interests of either worker or employer. Our obligation of impartiality is no less than that of the courts. If we give evidence or assume tasks unwarranted by our knowledge, we prejudice the decisions of judicial and legislative bodies. Unfair laws and unjust decisions reflect directly on members of our profession. Our duty is to know all that is knowable and to tell only what we know. We do not know the role of effort in creating or aggravating the condition in the vascular diseases under consideration. We can picture several possibilities for the victim

of thrombosis beginning during sleep. He may die without waking, feel pain and call help or get up in the morning unaware of what has happened. His first symptom may then occur while dressing, on his way to work, while doing his usual task or soon or late during unusual exertion. Then who is to say what was the role of effort in disabling or killing this man? If a worker suffers death with infarction without thrombosis under conditions of labor that might be termed accidental, and if his collateral vessels are found normal, his death may be attributed to industrial accident. But preliminary examination would hardly have saved the employer from such risk. For the present, we can be more efficient in the prevention of accidents than in the selection of workers able to withstand them.

DR. ROBERT T. LEGGE, Berkeley, Calif.: The question as to who can work is today an important problem. The employer in many instances would prefer to employ rejected men who have heart disease but are prohibited by compensation laws, increased insurance rates and the fact that a waiver is illegal. The unions are opposed to the changing of laws for any special legislation, fearing that it may invalidate the workmen's compensation act. The attitude of industrial physicians is in accord with the health programs for workers for preemployment and periodic examinations. The purpose is, of course, to improve efficiency of the individuals and to detect early defects that may arise in the course of employment. The vocational guidance committees of the various heart associations are definitely in accord in their efforts to solve problems by some uniform methods of class legislation, by special waivers or by the subsequent injury act. Dr. Behneman states that in California compensation is given in heart cases. Germany has a permanent disability provision requiring employers to carry 2 per cent of their injured. Such a measure should be adopted in our compensation laws. The National Institute for Cardiacs (Australia) not only secures employment for patients with heart disease but also guides and supervises them and establishes basic wages. America would be wise to adopt a like measure. Our knowledge today of coronary disease and hypertension warrants some modification of compensation laws in employing persons handicapped by heart disease, as the evidence here offered tends to substantiate. The Chicago Heart Association found that 1.34 per cent in thirteen industries were rejected on account of heart disease; 32.5 per cent of these were found able to go back to active service, while 42.2 per cent were restricted for modified duty. Master, Dack and Jaffe find only 2 per cent of coronary disease the result of effort. Berghoff, of Chicago, states that the mortality of coronary block is less than 10 per cent. Wychgel, in studies of arterial tension in steel workers 54 years of age, found that examinees with a systolic pressure of 200 and a diastolic pressure of 120 should be rejected.

DR. C. W. ROBERTS, Atlanta, Ga.: As a member of the Council on Industrial Health, I may be permitted to commend the section officers and the authors on the excellence of the program. This section of the Scientific Assembly is destined to grow as the rapidly expanding problems of industrial medicine are thrust on us. In an effort to extend the benefits of industrial medicine to the small plants in which most workers are employed, the Council on Industrial Health is vitally interested in the establishment of committees on industrial health in the various state associations, through whom it is believed that local postgraduate instruction may be provided. Your support of this movement is solicited.

DR. E. J. STIEGLITZ, Washington, D. C.: In connection with Dr. Behneman's paper I take some exception to the implied simplicity of the physiology of cardiac dynamics. I think that on further thought he would emphasize other factors, such as the availability of hemoglobin, the oxygen tension of the atmosphere, the availability of carbohydrate and insulin, which are all required by the myocardium. Furthermore, arterial constriction does not increase the pressure in the capillaries; it diminishes the blood supply distal to the narrowed arterioles. There is a definite slowing and sluggishness of the circulation distal to arteriolar constriction in hypertensive disease. A coronary accident, a coronary occlusion with or without infarction (and I have noticed the absence of any implication of a quantitative sense in evaluating coronary thrombosis and its consequences on myocardial function), is but a phase of the disease arteriosclerosis. The patient is not well prior to his coronary accident and doesn't necessarily become permanently disabled thereafter. The coronary occlusion is merely an acute exacerbation of a process which continues to exist and will continue to exist until death. It may or may not progress rapidly, depending on many factors. We must not separate too sharply a phase of the disorder from the disease itself. A similar thought applies in hypertensive arterial disease. We must recognize that it is a progressive matter. Neither hypertensive disease nor arteriosclerosis is curable. Therefore we should not talk about "cure" to the patient, the employer or the insurance company. These disorders frequently are, however, controllable. In our statements to these persons, be they patients or prospective employees, we should emphasize "control" of their disorder rather than "cure." It is not a question of being well or sick, as though there were a sharp line of distinction between the two. I doubt that any one of us in this room is 100 per cent well. The major problem in these cases is not the height of the arterial tension at the time the man is up for employment or reevaluation of his health but the rate at which his disorder is progressing. Determination of the rate involves somewhat more of a clinical examination than is carried out in many industrial health surveys.

DR. ARTHUR M. MASTER, New York: I agree almost entirely with the suggestions made, but I should like to take issue with a statement that effort precipitates coronary occlusion. My associates and I have reported that from one half to one million attacks of coronary occlusion occur annually in this country. Hence it is important to determine whether effort can precipitate coronary occlusion or thrombosis. It will readily be admitted that effort can induce angina pectoris and failure of the left side of the heart with pulmonary edema and probably failure of the right side of the heart. However, there is no evidence that effort can precipitate a coronary occlusion. All persons exert themselves strenuously frequently during the day. Driving and parking a car, raising windows which do not give readily, are commonplace severe efforts performed repeatedly by most people. If effort were a factor in precipitating coronary occlusion, every one with coronary artery disease would have an occlusion. Furthermore, the latter occurs in all classes irrespective of occupation, again evidence that physical exertion is no factor in the formation of coronary occlusion. Recently it has been theorized that exertion increases the aortic pressure and thus ruptures a capillary in a coronary artery; this in turn is supposed to initiate a thrombus. There is no evidence for this. As Dr. Stieglitz says, a rise in arterial pressure is not transmitted to the peripheral capillaries. The area of the latter is so great that pressure falls precipitately. Again, Winternitz has shown that capillary rupture is part of the arteriosclerotic process, but nowhere does he intimate that effort or increase in blood pressure will rupture a capillary. In fact, Winternitz injected the coronary arteries of patients dying of coronary disease using the unheard of pressure of 500 to 1,000 mm. of mercury and yet did not produce capillary rupture!

DR. H. M. F. BEHNEMAN, San Francisco: I realized what a controversial question this was, but that is what makes it worthy of presentation at these meetings. Opinions of many of us in indusrial work are molded not from what we were taught was the normal, ordinary course of events but from what we have learned by contact and experience over a period of time. I know of no industrial disease confronting the industrial physician more open to controversy than the relation of coronary disease to physical activity. California is highly unionized, particularly in San Francisco. Therefore the industrial physician in that community sees strong union pressure brought to bear in many of these cases. It has been my experience that the plaintiff in these cases is awarded a decision in his favor by the commission more often than it is denied him. This is true even though the majority of medical testimony may have been that the coronary attack was not caused or exacerbated by his labors. Such decisions to the contrary of medical opinion expressed at the hearing have been the inspiration of my plea to have a medical board of review. I could today cite many cases of men in advanced age spend-

ing years in sedentary occupations who are suddenly called on for excessive physical exertion and from that moment on have coronary disease of varying severity. Half of us here may say this sudden exertion played no part, and the other half might feel it did. Regardless of the physiology, such a case to a lay referee or jury is most often considered an industrial liability. A medical board of review could weed out many of these cases before they reach the commission.

THE THERAPEUTIC SIGNIFICANCE OF PLASMA PROTEIN REPLACEMENT IN SEVERE BURNS

ROBERT ELMAN, M.D.
ST. LOUIS

Of the 5,000 deaths each year in the United States attributed to the effect of severe burns, many could undoubtedly be avoided by adequate replacement therapy in this serious type of injury.

An excellent clinical lecture on the treatment of burns is the recent one by McClure;[1] he has discussed the various theories of the etiology of death, among which are hepatic insufficiency, infection, toxemia, adrenal insufficiency and, finally, the theory which explains most of the general manifestations on the idea that there is an extensive loss of protein. It is this last aspect of the problem which I believe is the most important and which I wish to emphasize. This is of particular practical importance since it concerns the type and amount of fluids that are administered to a severely burned patient. It will be part of my purpose to present observations indicating that the type of fluid given is of decisive importance; the administration of dextrose and saline solution alone in burns is not only often ineffective but may, if excessive, be actually dangerous.

In saving the lives of severely burned patients a second point is worth emphasizing. There is among physicians a definite pessimism when confronted with an extensive burn, based on the inference that, since large areas of skin are involved, it will be impossible to obtain a sufficient amount of normal skin for skin grafting later. This idea is often erroneous as far as the burn turns out to be first or second degree and therefore requires no skin grafting whatever. It is obvious then that, if these patients could be carried over the acute stage of their disease and the general manifestations corrected, not only would lives be saved but further treatment would become unnecessary.

The historical background for the theory of protein loss in burns can be sketched briefly. It is interesting to note that almost a hundred years ago (1855) Buhl[2] observed a number of burned patients and noted changes similar to those produced in cholera, that is that there was in both a concentration of the blood with an increase in the concentration of the red blood cells and an extreme dryness of the skin and mucous membranes. In 1881 Tappeiner[3] studied four fatally burned patients as well as experimentally burned rabbits. Handicapped as he was by older analytic methods, his observations and conclusions agree essentially with more recently held ideas. Thus he clearly differentiated the dehydration in cholera, which he said was due to loss of water, from that in burns, which he said was due to loss of plasma; he wrote "The concentration of the blood in burns occurs not through simple water loss but by loss of a fluid whose composition of solids is close to that of blood plasma." His therapeutic implications sound startlingly modern, i. e. "I consider as the cause of death in severe burns the concentration of the blood produced by transudation of plasma-rich fluid in the burned skin and recommend therapeutic transfusion of serous fluid." Although a good many observations were made in the succeeding decades, and especially during the last great war, an intensive study of burns was made by Underhill[4] and his co-workers after a theater fire in New Haven, Conn., in 1923 during which twenty-one victims were studied at the New Haven Hospital. Underhill[4] in 1927 expressed his views as to the treatment of burns as follows: "In treatment of burns, therefore, the essential object is to keep the blood concentration near a normal level until the blood capillaries in the skin injured by the heat have had an opportunity to repair themselves and again become capable of holding within themselves the fluid of the blood in a normal manner." This, he estimated, requires from twenty-four to forty-eight hours. Although he recognized the fact that the

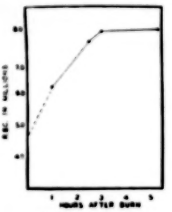

Figure 1 (case 1).

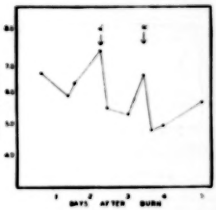

Figure 2 (case 2).

Figs. 1 and 2.—These graphs represent the red blood cell counts of two burned patients in the St. Louis City Hospital. The first patient, a woman aged 25, was admitted at 6 p. m. on July 5, 1935, and died six hours later. The second patient, a woman aged [illegible], was admitted April 10, 1935, and died six days later. In both cases large amounts of parenteral dextrose and saline solution were injected. In figure 1 note the failure to influence the concentration of the blood, although 6,000 cc. of dextrose and saline solution was injected in four hours. In figure 2 the prompt effect of 400 cc. of acacia (*A*) as well as 450 cc. of plasma (*P*) in lowering the red blood cell count is clearly seen. Other fluids to the extent of from 6,000 to 8,000 cc. a day were relatively ineffective.

blood concentration was due to loss of plasma rather than of water and electrolyte, he recommended only the injection (or the ingestion) of a large amount of simple fluids. In a monograph published in 1930 by Pack and Davis,[5] the use of transfusions is mentioned but these authors stated that "Intravenous saline solution and glucose venoclysis are inexpensive and more than satisfactory substitutes for blood because they are dilutants of the concentrated blood and, moreover, flush the kidneys of toxin." A few years later, in 1933, McIver[6] reported considerable data in a series of extensive cutaneous burns and noted that the blister fluid was like plasma and contained 3.7 per cent of total protein. He stated, therefore, that "loss of fluid is not simply a loss of water content of blood but of a substance that is closely parallel to whole plasma." In

Read before the Society of Clinical Surgeons, St. Louis, April 29, 1940.
From the Department of Surgery, Washington University School of Medicine, and the Barnes, St. Louis Children's and St. Louis City hospitals.

1. McClure, R. D.: The Treatment of the Patient with Severe Burns, J. A. M. A. **113**:1808 (Nov. 11) 1939.
2. Buhl: Epidemische Cholera, Ztschr. f. rat. Med. **6**:1, 77, 1855.
3. Tappeiner: Ueber Veränderungen des Blutes und der Muskeln nach ausgedehnten Hautverbrennungen, Centralbl. f. d. med. Wissensch. **21**:385, 401, 1881.
4. Underhill, F. P.: Changes in Blood Concentration with Special Reference to the Treatment of Extensive Superficial Burns, Ann. Surg. **86**:840 (Dec.) 1927.
5. Pack, G. T., and Davis, A. H.: Burns, Philadelphia, J. B. Lippincott Company, 1930, p. 115.
6. McIver, M. A.: Study in Extensive Cutaneous Burns, Ann. Surg. **97**:670 (May) 1933.

the treatment of his patients, however, plasma transfusions were not used, and he does not mention this form of therapy.

A large series of experimental studies on cutaneous burns have been made especially during the past decade; these will not be summarized here since they were reviewed by Harkins and Harmon[7] in 1937. Suffice it to say that all these studies have definitely demonstrated that, following a severe burn, there is a tremendous loss into the burned area of a fluid which has a composition which is close to that of plasma. Indeed, Blalock and his co-workers showed that the loss of plasma alone could itself be of sufficient magnitude to produce symptoms of shock.

Direct measurements of plasma protein of burned patients were reported by Davidson and Matthew[8] in 1927. They observed six cases and found relatively little change in the total plasma protein, although there was a fall in the albumin and a rise in the globulin fraction. Such observations, in view of the concentration of the red cells, really mean loss of plasma protein, because if water and electrolyte alone were lost as in other types of dehydration the serum protein would be more concentrated.[9] Davidson and Matthew[8] therefore did not advise the use of plasma transfusions or blood in the treatment of severe burns. It is of interest, however, to note that in 1921 Robertson[10] described

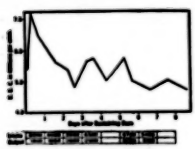

Figure 3 (case 3).

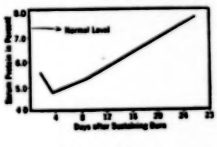

Figure 4 (case 4).

Figs. 3 and 4.—These graphs show the behavior of the red blood cells and serum protein in two cases of severe burn. Note in figure 3 the high red blood cell count, which was permanently relieved only after six days, in spite of a tremendous fluid intake. (The figures for intake and output are in cubic centimeters.) Note also the low urinary output during the first few days; obviously much of the injected fluid escaped into the tissues, both normal as well as burned areas. In figure 4 note the low serum protein, which required four weeks before restoration was complete in spite of a high caloric, high protein diet (copied from Cole and Elman[11]).

six severely burned children in whom dramatic therapeutic effects followed the use of large transfusions. However, four of these children were bled before the borrowed blood was injected. This now discredited procedure of exsanguination-transfusion is based on the idea that death is due to a toxin in the circulating blood. It is obvious, moreover, that exsanguination played no role, because Robertson obtained the same beneficial results on patients given a transfusion without a preliminary exsanguination. It is significant to note that this worker used large amounts of blood, e. g. he injected as much as 400 cc. into a 2 year old child.

My interest in burns was stimulated in 1935 following a serious sewer explosion in St. Louis during which many workmen were severely burned. In 1936 in a brief report by Weiner, Rowlette and Elman[9] data on forty patients with severe burns treated at the St. Louis City Hospital were given; a very definite relative as well as actual fall in the concentration of the serum protein was observed. It was pointed out too that large amounts of dextrose or saline solution were deleterious in that edema might be provoked thereby. The use of large plasma transfusions and a large protein diet was described and advocated in this paper. In the "Textbook of General Surgery," appearing first in 1936, Cole and Elman[11] made the statement that "too much fluid may be deleterious unless urinary excretion is adequate because it is apt to produce a general edema. . . . True replacement therapy, therefore, should consist of intravenous injection of blood plasma." More recently Lucido,[12] also at the St. Louis City Hospital, observed that a severely burned patient excreted large amounts of nitrogen in the urine and that this evidence of excessive destruction of protein was an additional reason for the administration of a large protein intake in these severely burned patients.

Within the past year or two there has been a growing realization of the importance of plasma loss in burns and the application of this idea to the treatment of severely burned patients in that large amounts of plasma protein must be injected in order to achieve a beneficial therapeutic effect. The report of Trusler, Egbert and Williams[13] as well as that of Elkinton, Gilmour and Wolff[14] should be mentioned in this connection. The observations of these two series of workers agree essentially with ours as reported in 1936, which are described in more detail and extended by the evidence now to be presented.

PRESENT OBSERVATIONS

The ineffectiveness of dextrose and saline solution in correcting the red blood cell concentration is illustrated in several charts representing cases in which frequent red cell counts were done. This is a simple and usually accurate clinical method of following the changes in relative plasma volume. It will be seen in case 1 (fig. 1) that 6,000 cc. of parenteral fluid had no effect in halting the increasing dehydration which finally led to death six hours after admission. In contrast is the red blood cell curve in case 2 (fig. 2), in which the prompt effect of acacia on one occasion and plasma on another in lowering the red blood cell count is shown. In case 3 (fig. 3), although large amounts of dextrose and saline solution were administered, it required five days before there was a permanent fall in the red blood cell count. Urinary output was low during this period in spite of the large intake; obviously much of the injected fluid was accumulating in the tissues even though edema was not evident. In case 4 (fig. 4) the low serum protein is shown as well as its slow return to normal, requiring four weeks.

As an example of the dramatic effect of adequate transfusions, the following case is described, the details of which were kindly given me by Dr. N. A. Womack:

Case 5.—W. M., a boy aged 3½ years (weight 15 Kg.), was admitted to the St. Louis Children's Hospital Sept. 12, 1938, one hour after his clothes had caught fire from a blow torch. It was estimated that 40 per cent of his body was involved; this was evident from the subsequent course. He

7. Harkins, H. N., and Harmon, P. H.: Plasma Exudation, Ann. Surg. **106**: 1070 (Dec.) 1937.

8. Davidson, E. C., and Matthew, C. W.: Plasma Protein in Cutaneous Burns, Arch. Surg. **15**: 265 (Aug.) 1927.

9. Weiner, D. O.; Rowlette, A. P., and Elman, Robert: Significance of Loss of Serum Protein in Therapy of Severe Burns, Proc. Soc. Exper. Biol. & Med. **34**: 484 (May) 1936.

10. Robertson, B.: Blood Transfusion in Severe Burns in Infants and Young Children, Canad. M. A. J. **11**: 744 (Oct.) 1921.

11. Cole, W. H., and Elman, Robert: Textbook of General Surgery, New York, D. Appleton-Century Company, 1936, p. 309.

12. Lucido, Joseph: Metabolic and Blood Chemical Changes in a Severe Burn, Ann. Surg. **111**: 640 (April) 1940.

13. Trusler, H. M.; Egbert, H. L., and Williams, H. S.: Burn Shock, J. A. M. A. **113**: 2207 (Dec. 16) 1939.

14. Elkinton, J. R.; Gilmour, M. T., and Wolff, W. A.: Control of Water and Electrolyte Balance in Surgical Patients, Ann. Surg. **110**: 1050 (Dec.) 1939.

had already been given a sedative of morphine; he was debrided in a tub of warm water without further sedation. A continuous venoclysis was then started and 300 cc. (20 cc. per kilogram) of whole citrated blood given the same evening. Although he vomited, his general condition was good following the blood transfusion and the injection of intravenous fluids but by the next morning, twenty hours after the burn, he was semicomatose and had generalized convulsions. A second transfusion of 300 cc. plus 5 cc. of adrenal cortex extract was given at 8 a. m. Following this the patient was more alert but slumped again the second night, so that the next morning he was given a third transfusion of 300 cc., following which he was alert and rational and began to take fluids by mouth. The fourth day he received a fourth transfusion of the same amount and by the next day all fluids were taken by mouth and he made an uneventful recovery, being discharged October 14, thirty-two days after admission, with no loss of skin, the burn healing spontaneously without scar and without the necessity of skin grafting. He received during the first four days a total of 1,200 cc. of blood in addition to other parenteral fluids.

COMMENT

Loss of protein is clearly an important and serious effect of severe cutaneous burns. This loss affects not only tissue protein but plasma protein. Moreover, it seems likely that many if not all of the general manifestations of severe cutaneous burns are connected with this loss. As far as the plasma is concerned, it is obvious that fluid containing only dextrose or saline solution alone will not of itself replace this loss because of the essential need for plasma protein. This need is due to the importance of maintaining the osmotic pressure of the circulating blood. Fluid without colloid properties when injected intravenously soon escapes from the blood bed and fails to relieve the essential hemoconcentration (fig. 5). The effectiveness of acacia (fig. 2) points to the importance of colloids in keeping fluid within the blood vessels.

The magnitude of replacement therapy designed to meet the plasma loss is not generally realized. It is therefore important to point out that 20 cc. of blood per kilogram of body weight, repeated each day for four days, was necessary in the reported case. This would correspond in an adult to transfusions totaling 5,500 cc. of whole blood. Anything less would probably not replace the large amount of lost plasma protein. Although true replacement therapy would consist of plasma transfusion, it is probable that unless plasma can be obtained readily whole blood is just as effective even though the red cells are really not needed.

In general we have given plasma to children in single doses of 10 cc. per kilogram of body weight, repeated as frequently as necessary. Recently we injected with dramatic results 200 cc. of plasma three times in forty-eight hours in a girl weighing only 18 Kg. Because of the practical problem involved in giving 1,500 cc. of blood to an adult, the possibility of supplying at least part of the lost protein by the injection of amino acids is pertinent. While such a method of parenteral protein replacement is practical, its use in burns awaits clinical trial. I have not used amino acids because of the possible difficulty in promoting serum albumin synthesis in this way and because it seemed more direct to replace the lost protein by plasma transfusions, since the loss is acute and requires treatment for only a few days. Nevertheless, it may prove a great practical advantage to inject amino acids to supply much of the need for tissue protein, combining it with a relatively small transfusion to supply the need for the serum protein. Observations along this line are now being made.

As a substitute for plasma protein, acacia has been used because of its colloidal properties (case 2). The beneficial effects of acacia are definite and such a solution is far superior to dextrose and saline solution alone. Obviously, however, acacia is a foreign substance and if given in large amounts may be taken up by the liver and interfere with hepatic function. If possible, therefore, plasma is definitely preferable. I would use acacia only once and even then only in an emergency while waiting for the preparation of whole blood or plasma.

The value of adrenal cortex extract has been questionable in our experience. It was given in case 5 along with repeated and large transfusions. In other cases in which smaller or no transfusions have been given it has been used repeatedly without effect. On the other hand, it is important to note the recent clinical and experimental observations of Wilson and Stewart,[15] who have found significant benefits following the use of the synthetic adrenal cortex hormone desoxycorticosterone acetate.

The local treatment of the burned area, while not a part of the present discussion, probably does have some influence on the degree of plasma loss and especially on the tendency to infection, which, when it occurs, leads to increases in protein loss by way of the extensive purulent exudation. In the local treatment, therefore, adequate, thorough cleansing and débridement is essential even if general anesthesia has to be used to do so. Proper protection of the wound after this is carried out is important in order to prevent secondary infection and to assure the comfort of the patient largely by relieving pain. These ends, in my experience, are best subserved by an adequately made dry crust over the area. A simple method which we use at the St. Louis City Hospital is the application of silver nitrate 10 per cent and tannic acid 20 per cent alternately not only over the obviously burned area but well beyond, until a line of demarcation is visible. I have repeatedly observed that when infections occur they start at the edge of the burn and usually at an inadequately cleansed or improperly tanned zone.

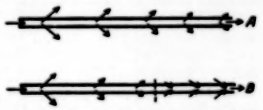

Fig. 5.—Diagram of the fluid flow in the capillaries, which act as a semipermeable membrane and illustrate the effects of Starling's hypothesis (Schade, H.; Claussen, F., and others: Ztschr. f. d. ges. exper. Med. 49: 334, 1926). *A*, fluid escapes from the lumen into the tissue spaces when osmotic pressure is low, owing to the absence of colloids in the blood. This occurs when dextrose and saline solution is injected into a burned patient who has lost a large part of his blood colloids (plasma protein). *B*, the normal condition; note that fluid flow from the lumen is limited whereas passage of fluid from the tissue spaces to the lumen occurs. This behavior is due to the presence within the capillary lumen of blood which has a high osmotic pressure owing to its high colloid (protein) content.

SUMMARY

The general manifestations of a severe burn develop rapidly; if they are combated promptly, many lives will be saved. These manifestations are due largely to rapid and extensive loss of both tissue and especially plasma protein. Replacement of the latter by plasma transfusion is essential to maintain the circulation and to relieve the concentration of the blood. The magnitude of the plasma loss is such that 10 cc. of plasma or 20 cc. of whole blood per kilogram of body weight

15. Wilson, W. C., and Stewart, C. P.: Changes in Blood Chemistry After Burning Injuries, Tr. Med.-Chir. Soc. Edinburgh, 1938-1939, p. 153; in Edinburgh M. J., November 1939.

may have to be given and be repeated if necessary. A high protein diet is also necessary as soon as nourishment by mouth is possible. The intravenous injection of amino acids as a partial or complete substitute for plasma transfusion awaits clinical trial. A single injection of acacia may be used if no blood is available, but it is greatly inferior to plasma. The injection of large amounts of dextrose and saline solution alone in severe burns may prove not only ineffective but may even produce deleterious results. Since many severe burns may not require skin grafting, the therapeutic problem is largely one of combating the general manifestations.

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MEDICATION IN THE CONTROL OF PAIN IN TERMINAL CANCER

WITH REFERENCE TO THE STUDY OF NEWER SYNTHETIC ANALGESICS

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My purpose in this paper is to emphasize certain facts and modes of thought which it is hoped will cross the mind of the reader when next he encounters a patient suffering the pain so frequently attending the terminal phase of incurable cancer.

It is essential that the observer assure himself that this is a terminal case, that all avenues of therapy have been blocked, all methods of treatment exhausted, and that the comfort of the patient is the only thing for which he can hope. Even at this point it is incumbent on the physician to be on the alert for any sign which might indicate that new therapy or further treatment might promise a period, however short, of useful existence.

Most obvious and most essential among the measures to insure the patient's enjoyment of his last weeks of life is the question of adequate nursing care. While the patient is able to care for himself fairly well he may be managed at home, but when he has reached the stage where his is a bed and chair existence or where frequent attention is necessary he is best cared for in some institution. Here the correct execution of the doctor's orders is more certain and the family is spared the ordeal of watching each minute of the patient's decline. Frequent changes of linen, special precaution to prevent decubitus and the cleaning and dressing of draining or raw surfaces as well as provision for the minor surgical procedures which go so far in maintaining psychologic and physical ease are best attended to by nurses trained in this work. But here I would make the plea for temporary omission of the bustling routine of the daily bath or vigorous bed change if the patient is suffering a particularly bad day.

The use of some soothing or anesthetic topical application to painful ulcerated areas or regions subject to irritation, as in the vulva in cases of carcinoma of the cervix with vesicovaginal or rectovaginal fistula, may decrease the necessity for stronger analgesics. For this purpose benzocaine ointment 7 per cent has been found very useful. It has been used for periods up to six months with frequent daily applications without apparent harm or loss of effectiveness.

Careful attention to an adequate diet, particularly in reference to fluid and vitamin intake, is essential in helping to maintain the patient in comfort. Special care to the function of the bowels and bladder may be considered another must.

Aside from the nursing aspect, measures for controlling pain in the cancer patient may be listed as roentgenologic, surgical and medicinal. Choice of a method in any specific case should be based on the known life expectancy and know reaction to therapy in the particular cancer type with which one is dealing.[1] Medication for analgesia is placed at the end of this list knowingly, for it is well to exercise the other procedures before, not after, the effectiveness of medication has been exhuasted. The suitable patient going early to the roentgenologist or neurosurgeon for palliation is a far better risk and is given more complete and permanent relief of pain through these measures than through any known medication. Other procedures for pain control, notably freezing,[2] are still in the experimental stage and as such are best confined to the larger research centers under the supervision of specially trained and skilled investigators.

TABLE 1.—*Daily Evaluation of Abstinence Syndrome Intensity by the Point System*

Signs	Points
Yawning	1
Lacrimation	1
Rhinorrhea	1
Diaphoresis	1
Anorexia (40% drop)	3
Mydriasis	3
Tremor	3
Gooseflesh	3
Restlessness	5
Emesis (each)	5
Temperature (daily average) each 0.1 C. increase over addiction mean	1
Respiration (daily average) each respiration per minute over addiction mean	1
Systolic blood pressure (a. m.) each 2 mm. Hg rise over addiction mean (15 point limit)	1
Weight (a. m.) each pound lost from last addiction day	1
Total abstinence syndrome intensity daily is sum of points scored	

In consideration of medicinal analgesia, one may pass quickly over the coal tar analgesics, pausing only to mention that they be given a trial. Their inadequacies in controlling the borings, achings, stabbings and burnings of advanced cancer are well recognized, but an adequate trial is justified by their surprising efficiency in some cases. It is interesting to note that work by Hardy and Wolff at New York Hospital suggests that acetylsalicylic acid is of little use as an adjunct to the phenanthrenes, opiate synergism not being demonstrable

Read before the Section on Radiology at the Ninety-First Annual Session of the American Medical Association, New York, June 12, 1940.

The work reported in this paper is part of a unified effort by a number of groups to solve the problem of drug addiction. The participating organizations have been the Rockefeller Foundation, the National Research Council, the United States Public Health Service, the United States Bureau of Narcotics, the University of Virginia, the University of Michigan and the Massachusetts Department of Health.

1. Nathanson, I. T., and Welch, C. E.: Life Expectancy and Incidence of Malignant Disease: Carcinoma of Breast, Am. J. Cancer **28**: 40-53 (Sept.) 1936; Carcinoma of Gastro-Intestinal Tract, ibid. **31**: 457-466 (Nov.) 1937; Malignant Lymphoma, Fibrosarcoma, Malignant Melanoma and Osteogenic Sarcoma, ibid. **31**: 598-608 (Dec.) 1937. Daland, E. M.; Welch, C. E., and Nathanson, I. T.: One Hundred Untreated Carcinomas of the Rectum, New England J. Med. **214**: 451-458 (March 5) 1936. Peller, S.: Life Expectancy and Mortality from Skin and Lip Cancer, Am. J. M. Sc. **199**: 449-458 (April) 1940. Ewing, J.: Neoplastic Diseases, ed. 3, Philadelphia, W. B. Saunders Company, 1928. Cutler, M., and Buschke, F.: Cancer, Its Diagnosis and Treatment, Philadelphia, W. B. Saunders Company, 1938.

2. Smith, L. W., and Fay, T.: Temperature Factors in Carcinoma and Embryonal Cell Growth, J. A. M. A. **113**: 653-660 (Aug. 19) 1939. Gerster, J. C. H., and others: General Crymotherapy: Symposium, Bull. New York Acad. Med. **16**: 312-340 (May) 1940.

by the ingenious experimental method of Wolff, Hardy and Goodell.[3]

One of the newer analgesics, cobra venom, deserves further mention on the basis of reports which have been appearing in the literature.[4] The material was first used by the French but has been popularized in the United States by Macht. Reports on the various series studied clinically do not indicate that the work has been adequately controlled. Use of the material in 8 cases, a group acknowledged to be inadequate for statistical significance, has failed to justify the enthusiastic reports. Of the 8 patients only one seemed to experience any relief from pain, and this was not by any means complete. Further study is being carried on and a later report is anticipated. However, on the basis of experience recorded by others, the material may be given a trial before the patient is condemned to the use of narcotics.

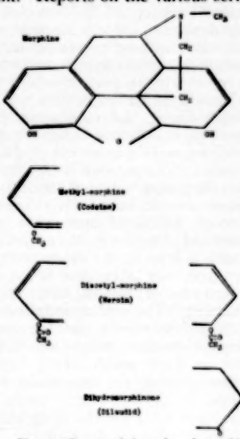

Fig. 1.—Structural formulas of morphine, codeine, heroin and dilaudid.

As yet no analgesic as efficient as the morphine group has been developed. This includes codeine, morphine, heroin and dilaudid. All are based on the same chemical foundation (fig. 1). A definite cross tolerance among them exists, so that one cannot expect to exhaust the effectiveness of one, then turn to the use of another with the hope that it will function to the degree it might have had if the patient had no previous narcotic experience.

The use of narcotics in the terminal cancer is to be condemned if it can possibly be avoided. Morphine and terminal cancer are in no way synonymous. Morphine usage is an unpleasant experience to the majority of human subjects because of undesirable side effects.[5] Dominant in the list of these unfortunate effects is addiction.

There were, according to the best estimates, approximately one hundred thousand addicts in the United States in 1924 and Kolb,[6] who published these figures, estimated that 14 per cent of these were normal persons accidentally addicted during therapy for pain. It is safe to say that this percentage is not lower today and it may increase as the number of inebriate addicts decreases through more effective control of their narcotic supply. This group of the unavoidably or inadvertently addicted is in particular the concern of the responsible physician. These people are suffering from what has become recognized as an actual disease. The disease is evidenced by increasing tolerance to and eventual dependence on the presence of an adequate amount of one of these drugs in the body. Such a state of dependence, addiction if you like, may develop in as short a time as three weeks of drug administration.[7] The presence of this state of dependence can be demonstrated only by the development of characteristic abstinence symptoms following withdrawal from the drugs. These phenomena may be listed as yawning, lacrimation, rhinorrhea, perspiration, goose flesh, mydriasis, tremor, restlessness, emesis, diarrhea, an increased temperature, increased respirations, increased blood pressure and decreased weight—all of which can be almost quantitatively observed [8] (table 1).

In addition, the patient frequently complains of cramps in the calves and abdomen, insomnia, weakness, anorexia, the presence of foul odors or tastes, lack of appetite and lack of desire to smoke. He may suffer priapism or pollutions. If a female, she may experience return of an inhibited menstrual flow. The development of this syndrome follows a typical pattern coming on, not abruptly on withdrawal, as is so often supposed, but gradually, reaching an unmistakably definite intensity on an average of fifteen hours following the last dose of narcotic. The syndrome increases in severity to the twenty-fourth hour, maintains this level of greatest severity for twenty-four to thirty-six hours and gradually falls to normal at about the seventh day [9] (fig. 2).

However, without withdrawal, dependence may be suspected in the patient who is receiving diminishing

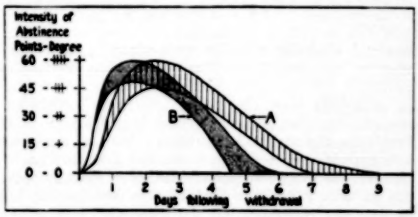

Fig. 2.—Two types of abstinence syndrome.

returns in analgesia with increasingly large doses of narcotics. This dependence, this addiction, is not to be condemned in the terminal cancer patient on moral or ethical grounds but on the very real factor that with dependence comes loss of analgesic effectiveness. If the patient may live more than three to four months, it is especially important that neurosurgery or palliative

3. Hardy, J. D.; Wolff, H. G., and Goodell, H.: Studies on Pain Sensation: I. Measurement of Pain Threshold with Thermal Radiation, Am. J. Physiol. **120:** 523 (July) 1939. Wolff, H. G.; Hardy, J. D., and Goodell, H.: II. The Quantitative Analysis of the Action of Analgesics, ibid. **120:** 656 (July) 1939.

4. Orticoni, A.: A propos de l'action du venin de cobra dans le traitement des algies et des tumeurs, Presse méd. **42:** 112-114 (Jan. 20) 1934. Macht, D. I.: Action du venin de cobra sur le senil de la douleur chez l'homme et chez le cobaye, Compt. rend. Soc. de biol. **120:** 286-289, 1935. Therapeutic Experiences with Cobra Venom, Ann. Int. Med. **11:** 1824-1833 (April) 1938. Taguet, C.: La cure des algies et des tumeurs malignes, Bull. et mém. Soc. de méd. de Paris **137:** 310-311 (April 29) 1933. Rutherford, R. N.: Use of Cobra Venom in Relief of Intractable Pain, New England J. Med. **221:** 408-414 (Sept. 14) 1939.

5. Kolb, L.: Pleasure and Deterioration from Narcotic Addiction, Ment. Hyg. **9:** 699-724 (Oct.) 1925; Reprint 211, National Committee for Mental Hygiene, 1925.

6. Kolb, L., and Du Mez, A. G.: Prevalence and Trend of Drug Addiction in the United States and Factors Influencing It, Pub. Health Rep. **39:** 1179-1204 (May) 1924; Reprint 924, United States Treasury Department, Public Health Service, 1924.

7. Sceleth, C. E.: A Rational Treatment of the Morphine Habit, J. A. M. A. **66:** 860-862 (March 18) 1916. Lambert, A.: The Doctor and the Drug Addict, Philadelphia County Medical Society Symposium November 10, 1920.

8. Himmelsbach, C. K., and Small, L. F.: Clinical Studies of Drug Addiction: II. "Rossium" Treatment of Drug Addiction, Pub. Health Rep. 1937, supp. 125, pp. 1-18.

9. Kolb, L., and Himmelsbach, C. K.: Clinical Studies of Drug Addiction, Am. J. Psychiat. **94:** 759-799 (Jan.) 1938. Studies on Drug Addiction, Small, L. F.; Eddy, N. B.; Mossetig, E., and Himmelsbach, C. K.: Pub. Health Rep., 1938, supp. 138, pp. 1-143.

roentgen therapy be urged in order that the effectiveness of morphine may be held in reserve for the last stages of the terminal phase when the patient's need for it is greatest.

Of the available narcotics codeine, morphine, dilaudid and pantopon [10] are the most widely used. Comparison of their dose effectiveness leads one to conclude that they are approximately equal in doses of codeine 1 grain (64 mg.), morphine ⅙ grain (10 mg.), dilaudid 1/150 grain (2 mg.), pantopon ⅓ grain (20 mg.). Addiction to all these materials develops, less rapidly to codeine than to the others, but codeine is less effective as an analgesic. Morphine is probably the most generally available and reliable of the other three, and certainly its cost per dose is less. Necessity for the use of these analgesics is materially reduced by careful attention to factors such as faulty fecal and urinary elimination and the clearing up of local infection. Palliation of these patients indicates intelligent treatment on all points, not the mere masking of symptoms by narcosis.

At the Pondville Hospital it is our practice, in dealing with the terminal patient, to give a narcotic in its minimal clinically effective analgesic dose, and judgment of the drug's effectiveness is based entirely on analgesia. If hypnosis is desired, a barbiturate may be combined with the opiate with very satisfactory results. Specifically our procedure is as follows: When first seen, the patient is withdrawn from all analgesics and hypnotics in order to determine first that he has need for the drug and second whether or not any previous narcotic experience he may have had has left him in any way dependent on the material. Following a period of eight to twenty-four hours of withdrawal the patient is placed on a dose, usually ⅙ grain (10 mg.) of morphine, with an order that it be given every three hours according to need for twenty-four hours. This usually results in good relief of pain, thereby establishing a rapport with the patient and giving the physician an opportunity to observe the effectiveness of medication. Each dose is followed closely with a written report of the drug effect from the attendant. Time of administration, time of onset of satisfactory analgesia, the degree of analgesia indicated as none, slight, fair or complete, time of return of pain, estimated hours of sleep following injection, respirations at the time of medication and thirty minutes later, and side effects such as nausea, vomiting, local reaction and diarrhea are listed with a note of any unusual or interesting occurrence or observation. These are incorporated in the narcotic drug record to insure that the nurses will remember and record them. A simple protocol form is all that is necessary (fig. 3).

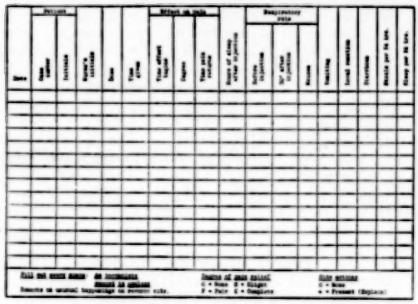

Fig. 3.—Protocol form.

By following such a record, supplemented by the patient's report and his own observations, the physician can determine the effectiveness of each dose and alter his orders to meet necessities as they arise. Following the initial twenty-four hours of good relief, the dose is reduced to the point at which the patient experiences mild pain for no longer than a half hour preceding each dose. Using the medication when this slight pain develops is sufficient indication that the patient is not receiving a dose in excess of the amount necessary for comfort. The removal of any time piece helps in avoiding the patient's natural tendency to ask for the medication on the hour. Any increase in dose is made through additional medication per dose, not through increased frequency of administration. A constant watch is kept for an opportunity to decrease the dose. A three hour interval is found to be satisfactory and a cooperative patient frequently prolongs this considerably. The oral or rectal route of administration is employed whenever possible out of deference to the needle's peculiar association with habituation. Every two or three weeks sterile hypodermic injections of saline solution are substituted for the narcotic medication for eight to twenty hours in order to prove the continued need for the drug and to allow the patient a period free from drug effect. This procedure is used since it is well known that small, regularly administered, doses may be counted on to cause and maintain addiction more certainly than larger, irregularly timed, medications. In administering the narcotics it has been found best to have the attendant, and most certainly the patient, ignorant of the nature and dose of the drug. Under no circumstances should the drug be self administered. It has been interesting to note that those patients who claim nausea from morphine are frequently relieved of both their pain and nausea by smaller doses.

It is obvious in this discussion that morphine has definite inadequacies in hospital use, and the general practitioner is faced with even more problems in morphine administration and control. With this in mind the Committee on Drug Addiction of the National Research Council, in collaboration with the United States Public Health Service, has attempted the difficult task of synthesizing a drug with all the attributes of morphine and none of its detriments. This problem was attacked through an exhaustive study of morphine and chemically related substances and has resulted in the production of many previously unknown phenanthrene derivatives. Each of these has been subjected to detailed pharmacologic investigation. Some few have survived this study and come to more or less clinical trial. Through the collaboration of the United States Public Health Service with the committee, the facilities of the Public Health Service Hospital at Lexington, Ky., the Walter Reed Hospital, Washington, D. C., and the Marine Hospital, Baltimore, have been made available. Through the courtesy of the Massachusetts Public Health Department the Middlesex County Tuberculosis Sanatorium at Waltham and the Pondville State Cancer Hospital in Wrentham provide facilities for study. Lately studies have been extended to the Massachusetts General Hospital. Details of these clinical studies will have to be made the subject of further reports, but

10. A preparation of the hydrochlorides of the alkaloids of opium, principally morphine.

it must be said that every effort has been made to keep the observations as objective as possible and free from any prejudice.

At the Pondville Hospital particular attention has been directed to the effectiveness of a new substance in comparison with morphine in terminal cancer and to the readiness with which tolerance and dependence are developed in such cases. To this end patients have been selected on the basis of (1) intelligence and cooperativeness, (2) lack of previous narcotic experience, (3) general physical condition, (4) terminal stage of their disease, (5) degree of pain as far as it could be determined, (6) necessity for continued hospitalization. Various preliminary tests had proved one drug more promising than all others developed in the cooperative study sponsored by the National Research Council. This drug was methyl dihydromorphinone.[11] Based on observation of the effects of eight thousand doses, the use of a 5 mg. dose of this substance in comparison with a 10 mg. dose of morphine is shown in table 2.

Tolerance to and dependence on methyl dihydromorphinone develop less rapidly than to morphine. Its hypnotic effect is less marked and of shorter duration. Fewer side effects have been observed in its use. After periods of temporary withdrawal, eight to fifteen hours, it has not been possible, on readministration of morphine, to obtain relief with less than the amount administered at the last dose before temporary withdrawal. It has been regularly possible, on readministration of methyl dihydromorphinone, to get relief with a smaller amount than was administered at the last dose before withdrawal. Frequently it has been possible to reduce the dose to the amount used in initiating narcotic administration. This factor alone is of tremendous importance in prolonging the period of continued analgesic effectiveness. The material has been used in cases for over six months without alteration in this factor.

TABLE 2.—*Results of Morphine 10 Mg. and Methyl Dihydromorphinone 5 Mg.*

	Morphine	Methyl Dihydromorphinone
Duration of relief	3 hours 29 minutes	2 hours 48 minutes
Time dose to relief	26 minutes	23 minutes
Hours sleep per dose	1 hour 55 minutes	1 hour 38 minutes
Respiratory depression (at 30 minutes)	0.9 respiration per minute	1.2 respirations per minute

It must be stated, however, that this material, methyl dihydromorphinone, remains to the present time a laboratory and clinical curiosity. The cost of its production is prohibitive, and it is not yet felt that sufficient clinical work has been done to warrant its return to the chemist for further study in regard to its production on a commercial basis. We are in hopes that an even better drug may eventually be provided.

CONCLUSIONS

Review of the facts and opinions here stated leads to the conclusions that:

1. Nursing, roentgenologic and surgical measures for controlling pain should be given precedence over chemotherapeutics in those cases whose life expectancy can be estimated as over three months.

2. More radical measures for therapy, such as freezing, should be reserved for the experimental centers.

3. Patients should be hospitalized for the terminal phase of their disease.

4. Narcotics are not a requisite, or even desirable, in all terminal cases of cancer.

5. Non-narcotic medication should be given a trial for pain control before condemning the patient to a life of dependence on narcotics.

6. Narcotics should be used and their effectiveness judged as analgesics, not hypnotics. The minimal clinically effective analgesic dose of a narcotic may be supplemented by hypnotic doses of a barbiturate if hypnosis is desirable.

7. Addiction may develop in three weeks of narcotic administration.

8. Addiction is to be avoided in the terminal cancer patient because with its development come diminishing returns in analgesia and increasing discomfort due entirely to addiction itself.

9. Through the facilities made available by the Committee on Drug Addiction of the National Research Council, hitherto unknown phenanthrene derivatives have been synthesized and subjected to pharmacologic and clinical investigation. The most promising of these to date is methyl dihydromorphinone.

11. Eddy, N. B.: The Search for More Effective Morphine-like Alkaloids, Am. J. M. Sc. **197**:464-479 (April) 1939.

ABSTRACT OF DISCUSSION

DR. DAVID I. MACHT, Baltimore: I agree with Dr. Lee that codeine has little value as an analgesic, and I have shown that the antispasmodic property of papaverine resides in its benzyl nucleus and the narcotic property of morphine in its phenanthrene nucleus (*J. Am. Pharm. A.* **17**:15, 1928). While the numerous compounds described by Small, Himmelsbach, Mosettig and others are marvels of chemical synthesis, they have not yielded a derivative superior to morphine in preventing addiction. Even methyl dihydroxymorphinone, says Dr. Lee, is but a curiosity. I therefore deem it unprofitable to search for other morphine substitutes in the phenanthrene field. Cobra venom, which Dr. Lee mentions, gives more promise as a morphine substitute. Its neurotoxin, while analgesic, is neither protein nor alkaloid but a glucoside (*Ber. d. deutsch. chem. Gesellsch.* **71B**:1302, 1908). My first report (*Proc. Nat. Ac. Sc.* **22**:61, 1936) of 105 cases treated with cobra venom showed that this drug effected some degree of analgesia in 60 per cent of the series. During the last three years the use of cobra venom has increased to such an extent that two thousand boxes are now being consigned monthly to physicians and hospitals. Cobra venom analgesia is localized in the hypothalamus, and the drug neither affects sight or hearing nor depresses the frontal lobes or impairs mental efficiency. Its therapeutic margin of safety is wide, and doses of 5 to 10 mouse units are quite safe. Cobra venom is used to relieve the pains not only of malignant disease but also of neuralgia, arthritis and other chronic pathologic conditions. In therapeutic doses it does not impair kidney and liver function or affect blood morphology and chemistry. Years of clinical experience have revealed that nothing like narcotic addiction follows therapeutic use of cobra venom, which has been substituted largely for morphine as a pain-relieving agent and has also been successfully employed in treatment of a limited number of cases of true narcotic addiction. It is desirable to make an extensive study of cobra venom in the latter condition.

DR. LYNDON E. LEE JR., Wrentham, Mass.: The analgesic synergism Dr. Macht suggests between the isoquinoline group or papaverine and the phenanthrene group or morphine is very low and occurs in only about 50 per cent of people. The predominant effect of the isoquinoline group is the relaxation of smooth muscle as opposed to the contraction initiated by the phenanthrenes. With the administration of the combination, as in the use of opium, one obtains largely antagonistic rather than synergistic effects. It is possible that the apparent analgesic synergism occurs only in those cases in which smooth muscle spasm is a factor in causing pain. Dr. Macht suggests that further chemical and clinical investigation be carried on with substances other than opiates in an attempt to synthesize an analgesic. This is one of the important branches of the

work by the Research Council's Committee on Drug Addiction. Dr. Erich Mosettig has been paralleling Dr. Small's phenanthrene studies with work on dibenzofuran and carbazol, both unrelated to morphine. This work has reached a point at which he can supply some potent analgesics, but these are thus far so toxic in animals that we cannot afford to take them into the clinic for trial. I cannot sympathize with Dr. Macht's explanation of cobra venom as a simple substance. No work on its chemical nature has been published in this country. Hudson is not at all certain that it is a glucoside, and the filtration process of preparation is no guaranty that all protein constituents have been removed. The doses of cobra venom suggested earlier by Dr. Macht are considered to be entirely inadequate. They are tripled and quadrupled by other workers before any effect is noted. With regard to the use of cobra venom in withdrawal, here, as in other departments of study on the material, inadequate and uncontrolled work has been done. Of the one thousand addicts in the Kentucky Public Health Service Hospital and narcotic farm none, so far as I am aware, have attempted the alleviation of withdrawal phenomena by the use of cobra venom. Obviously a rigidly controlled study of this is desirable and no general use of the material should be made in this field until its worth has been proved.

Clinical Notes, Suggestions and New Instruments

APPARENT CURE OF A TYPHOID CARRIER WITH SOLUBLE IODOPHTHALEIN

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The report of Saphir and Howell [1] describing an apparent cure of a carrier of the typhoid-paratyphoid group by the oral administration of soluble iodophthalein has such potential significance from a public health standpoint that it was considered advisable to record another case in which the administration of the same drug was followed by the disappearance of Eberthella typhi from the stool.

REPORT OF CASE

C. B., a man aged 34, a Filipino living at the Hawaiian Homestead, Hoolehua, Molokai, was seen by a physician (P. W.) on the afternoon of Sept. 23, 1937. He gave a history of having felt "sick" since September 8 but he had not gone to bed. He complained of severe headache on September 17 but felt better on the 18th and 19th. On the 20th the symptoms became so severe that he went to bed. He summoned his physician on the 23d. The physician, suspecting typhoid, immediately had the patient hospitalized at the Robert W. Shingle Jr. Memorial Hospital on Molokai, where a stool was taken September 26 and found positive for Eberthella typhi.

All contacts were immunized and stools obtained for culture. No positive stools were found among the contacts, including H. B., the wife of the patient. The date of recovery of this patient is not recorded.

On May 8, 1940, another case of typhoid was discovered. G. P., a man aged 30, a Hawaiian from Kawela, had stool cultures positive for Eberthella typhi.

The usual investigation of contacts disclosed that C. B. and his wife H. B. had moved to this locality and were intimate contacts of G. P. Stools submitted by C. B. were negative but a stool submitted by H. B. on May 25 was found positive for Eberthella typhi. She was admitted to Ualapue Hospital, May 31, by Dr. T. M. for a period of observation. During her stay in the hospital her temperature was normal at all times and all examinations gave essentially negative results except that she was in the seventh month of pregnancy. On May 28, in the course of investigation, she as well as all other contacts had received the first injection of typhoid-paratyphoid vaccine.[2] She received her second injection June 4 and her final one June 11. She was kept in the hospital throughout the month of June and no symptoms or signs of typhoid developed. Five stool examinations were made during her stay, the laboratory reporting them positive for Eberthella typhi on June 11, 15, 18, 20 and 30. As there is only one bacteriologic laboratory on Molokai, some difficulty had been experienced in the past in obtaining fresh stools for culture. In 1937 the stool specimens submitted were in many cases taken the day previous or many hours before plating could be done. This may have been the reason positive stools were not found at that time. As Havens [3] states that immediate examination, lacking special means of preservation, is necessary to prevent the enormous overgrowth of Bacillus coli, a special effort was made in May and June 1940 to have all specimens submitted for plating within two hours. The stools were plated on eosin-methylene blue agar and bismuth sulfite agar. Suggestive colonies were transferred to Russell's double sugar medium and confirmed by hanging drop examination and agglutination with specific antiserum.

The patient appeared perfectly normal during her stay, showing no symptoms or signs of any illness except for having consistently positive stools. As there is no regulation in the territory requiring isolation of a typhoid carrier, she could not be held in the hospital. The patient grew very restless and wished to return home to take care of her six children. The husband, who was receiving aid through social security, was unable to go to work because he had to take care of the children, although employment was available.

In view of these facts, the patient was given permission to go home, provided she did not act as a food handler and observed proper precautionary measures. This department, in a communication to her physician, referred to the article of Saphir and Howell [1] and suggested that before her discharge from the hospital soluble iodophthalein be given by mouth in the manner described by the authors. Accordingly, 3.5 Gm. of soluble iodophthalein was given by mouth on July 4, followed by 3.5 Gm. on July 8. A stool taken on July 9 was found to be negative for Eberthella typhi. A third dose of 3.5 Gm. was given on July 11 and stools taken on the 12th and 13th were also found to be negative. The patient was discharged from the hospital and returned to her home. She will be followed and a careful check made of stools for a period of at least one year. She will then be classified as carrier free if her stools remain negative.

No conclusions can be drawn from this single case but because of the abrupt disappearance of Eberthella typhi from the stools following the oral administration of soluble iodophthalein it seems that the result in this case parallels Saphir and Howell's result and warrants the trial of this comparatively harmless treatment on carriers of the typhoid-paratyphoid group before surgical treatment is considered. It may also be well to emphasize the value of plating fresh stools in the search for carriers.

From the Board of Health, Territory of Hawaii.

1. Saphir, William, and Howell, Katharine M.: Soluble Iodophthalein in Treatment of Carriers of Typhoid-Paratyphoid Group, J. A. M. A. 114:1988 (May 18) 1940.

RELAPSING FEVER: REPORT OF THREE CASES, ONE IN A SIX DAY OLD INFANT

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That relapsing fever "has been rarely observed in the United States," as recently stated by Neilson,[1] is not exactly true, particularly as concerns California and Nevada. Endemic foci at Big Bear Lake in the San Bernardino Mountains some 60 miles east of Los Angeles and at Lake Tahoe in the Sierra Nevada Mountains about 50 miles from Reno, Nev., have been known for a number of years. About twelve years ago Dr. Charles W. Bonynge demonstrated the spirochetes (Borrelia recurrentis) of relapsing fever in blood smears of a patient from Big Bear

2. Lilly's V 765 vaccine was used.

3. Havens, L. C.: The Bacteriology of Typhoid Salmonella and Dysentery Infection and Carrier States, New York, the Commonwealth Fund, 1935, p. 3.

Dr. Karl F. Meyer, Director of the George Williams Hooper Foundation for Medical Research, University of California, San Francisco, gave helpful counsel.

1. Neilson, W. P.: Report of a Case of Relapsing Fever, J. A. M. A. 115:125 (July 13) 1940.

Lake at one of the monthly meetings of the Los Angeles Pathological Society, and the members present were impressed by the rarity of cases at that time.

Since 1933 we have seen about half a dozen patients with relapsing fever each summer here in Reno, nearly all the patients acquiring the infection at Lake Tahoe, where the strawberry mite (Ornithodoros hermsi), a small tick living on the gray tree squirrel, transmits the disease to man. Guttman [2] of Sacramento, Calif., sees about as many cases each summer as we do, and a technician in the laboratory in which one of us (L. P.) is associated states that Dr. Paul W. Christman, another pathologist in Sacramento in whose laboratory she was employed for four years, also sees quite a number of cases each summer vacation period. In most cases these originated at Lake Tahoe.

Recently, however, we have seen three cases occurring in one family who had not been to Lake Tahoe this year. These cases are of interest since one, the newborn infant, may have acquired the infection in utero.

REPORT OF CASES

CASE 1.—Mrs. H. G. aged 28, under the care of one of us (S. K. M.), suffered premature rupture of the fetal membranes on May 24, 1940. On the following day she had a severe chill, complained of headache, had a fever of 103 F. and was admitted to St. Mary's Hospital. The blood count on admission showed 68 per cent hemoglobin (14.5 Gm. = 100 per cent), 3,750,000 erythrocytes and 7,600 leukocytes, with 85 per cent neutrophils, 18 per cent of which were nonfilament forms. The urine was normal and the Kolmer blood Wassermann reaction was negative. Labor was induced and a female infant weighing 5 pounds 15 ounces (2,693 Gm.) was delivered; it appeared slightly premature.

May 26 the mother again had a severe chill and a temperature of 105 F. The leukocyte count was 8,550 with 83 per cent neutrophils, 20 per cent being nonfilament forms. In view of the apparent absence of puerperal infection, pneumonia or other cause for the chills and fever, the laboratory was asked to examine the patient's blood smears for the spirochetes (Borrelia recurrentis) of relapsing fever. A rather extensive experience with this disease in this locality had taught the lesson of suspecting it in otherwise healthy persons with essentially normal leukocyte counts but suffering chills and fever who had recently visited Lake Tahoe. The patient and her husband had not been there for a year, but it was nevertheless thought worth while to attempt to find the spirochetes. Numerous organisms of Borrelia recurrentis were found in the blood smears stained with Wright's stain. Neoarsphenamine 0.45 Gm. was given intravenously; the temperature returned to normal within twelve hours and remained so.

CASE 2.—The baby six days after birth suddenly became ill with a fever of 104 F., cyanosis and difficult breathing. The leukocyte count was 7,200, with 61 per cent neutrophils, of which 5 per cent were nonfilament forms. Relapsing fever was suspected and numerous organisms of Borrelia recurrentis were found in blood smears, four or five being frequently observed in a single oil immersion field. They were very active and numerous in the dark field examination of a wet preparation of untreated blood. Sulfarsphenamine 0.075 Gm. was given intramuscularly, but since the fever persisted and the spirochetes could still be found in the blood smears after thirty-six hours, 0.10 Gm. more was given. The temperature thereupon returned to normal within twenty-four hours and the baby has remained well.

CASE 3.—M. G., the husband, on June 6, twelve days after his wife had become ill, suddenly had severe chills, headache and a high fever. Organisms of Borrelia recurrentis were found in his blood smears. His leukocyte count was 9,500, with 72 per cent neutrophils, 5 per cent being nonfilament forms. Neoarsphenamine was given intravenously and his temperature returned to normal within thirty-six hours.

COMMENT

Whether the baby was infected in utero by the passage of the spirochetes in the mother's blood through the placenta or was inoculated by them through the unbroken skin during its transit in the birth canal, as suggested by Dr. Karl F. Meyer, is an open question. The incubation period would fit either case. No strawberry mites (Ornithodoros hermsi) or rodents were found in the trash-littered basement of the home of the parents. Several ticks were found but not of the Ornithodoros group. The home was thoroughly fumigated with hydrocyanic acid gas.

2. Guttman, P. H.: Personal communication to the authors.

SUMMARY

1. Relapsing fever is fairly common in California and Nevada during the summer months.

2. The three cases reported here occurred in the members of one family.

3. The newborn infant may have been infected by placental transmission or possibly during its passage through the birth canal.

4. Relapsing fever is suspected in this region in persons taken suddenly ill for no obvious cause, having chills, fever, headache and a normal leukocyte count. Mild leukocytosis is uncommon.

15 East First Street.

Special Article

GLANDULAR PHYSIOLOGY AND THERAPY

DYSFUNCTIONS OF THE ANTERIOR LOBE OF THE PITUITARY AND THEIR TREATMENT

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This special article is published under the auspices of the Council on Pharmacy and Chemistry. It is one of a series which will be published in book form as the second edition of "Glandular Physiology and Therapy." The opinions expressed in this article are those of the author and do not necessarily represent the views of the Council.—ED.

Among the disturbances of the several functions of the anterior lobe of the pituitary, only two are susceptible to treatment with any assurance of success at present. These are dysfunctions in the supply of the growth-promoting and gonadotropic factors, which will be discussed in detail. Although the thyrotropic extracts of the anterior lobe of the pituitary have been shown to act in some persons, it has not yet been possible to secure sustained stimulation of the thyroid in hypothyroid patients.[1] Neither is there adequate evidence to warrant routine irradiation of the pituitary in an attempt to reduce production of the thyrotropic substance in patients with persistent thyrotoxicosis. The factors involved in pituitary stimulation of the adrenal glands are still further removed from immediate application in human therapy. The dysfunctions known under such terms as "basophilism," "Cushing's syndrome" or "the adrenogenital syndrome" will be discussed in another article of this series.[2] Therapy directed to the pituitary is to be considered in such cases only when a tumor is demonstrable, and then it should consist of hypophysectomy or destructive irradiation. The effects of anterior pituitary extracts on carbohydrate and fat metabolism in experimental animals probably have their counterparts in human clinical situations, but at present the most that can be done is to watch for

From the Wisconsin General Hospital.

1. Thompson, W. O.; Thompson, P. K.; Taylor, S. G., III, and Dickie, L. F. N.: Influence of Pituitary in Thyroid Disease, West. J. Surg. 47:4-9 (Jan.) 1939.

2. Section IV-a of outline for the book "Glandular Physiology and Therapy."

evidences of disturbed sugar tolerance in patients with other anterior lobe dysfunctions and for stigmas of pituitary disorders in those who are known to have diabetes mellitus or recurrent severe hypoglycemia.

DYSFUNCTION IN SUPPLY OF GROWTH HORMONE

Gigantism.—Excessive activity of the anterior lobe of the pituitary in stimulating growth during childhood and early adolescence may so augment the rate of increase in stature that gigantism is produced before the closure of the epiphyses limits further elongation of the long bones. It seems unwise to use irradiation to limit this growth because of the danger of simultaneously interfering with other pituitary functions. Attempts to limit stature should not be undertaken until the child is over 5 feet (152.5 cm.) tall, for an alarmingly fast growth may subside spontaneously as stature approaches the usual adult range. Clinical experience in this field is still meager, but it is possible to observe the maturation of bones with films taken at intervals of six to twelve months and to stimulate maturation in the ossifying process when there is delayed epiphysial union. The physiologic factors which hasten this maturation are thyroid, androgen and estrogen. Occasionally these principles have been used in an attempt to expedite the union of epiphyses, because the effects of such substances on structures other than bone are temporary or are merely additive to the secretion of the glands in the child's body. Such a program is admittedly still experimental, and the dosage cannot be specified. This type of therapy should be undertaken only by a clinician with experience in judging the actions of the substances used.

Acromegaly.—When excessive pituitary secretion of the growth-promoting factor occurs after the union of the epiphyses, the bones and soft tissues undergo changes known as acromegaly. If this process is diagnosed while still active, it may be worth attempting to reduce pituitary activity. In cases of acromegaly associated with tumor of the pituitary the choice between surgical removal or irradiation needs to be made. When no neoplasm can be demonstrated, one may hesitate to employ destructive irradiation. Under such circumstances large doses of estrogen have been reported to give at least temporary benefit.[3] It has been supposed that this acts by inhibition of anterior lobe function. Use of testosterone for this purpose has not been reported. Since acromegaly without a tumor is most apt to occur at the climacteric and is frequently associated with increased growth of facial hair in women, testosterone is not recommended for female patients with acromegaly. The duration of active acromegaly is highly variable, and the need for therapy therefore questionable. The common clinical problem is merely the control or stopping of regional symptoms of tumor and headache, which does not involve endocrine therapy. The occurrence of goiter, myxedema, diabetes mellitus, diabetes insipidus or adrenal insufficiency as complications of acromegaly is of importance in understanding pituitary functions. These complications are treated as when they occur under any other circumstances.

Dwarfism.—Underactivity of the growth-promoting factor during childhood is the cause of certain types of dwarfism. If no other adequate cause for the retardment of growth can be found, the cause is assumed to be hypopituitarism. This conclusion is fortified whenever there are any other evidences of a reduction or an alteration of the functions of the same gland. Exact criteria for hypofunction of the anterior lobe in this responsibility are not available. It is therefore probable that application of potent extracts of the pituitary will not be uniformly successful in treating dwarfism. The materials which have been used are aqueous extracts, which contain inert proteins in addition to the desired active substance. The physiologic action is to increase anabolic processes in many tissues, thereby increasing the positive nitrogen balance and increasing the body weight by the laying down of protein-containing tissues, included in which is an increased amount of bone.[4] There is no uniform method for biologic standardization of these growth-promoting extracts, and it is therefore impossible to make any accurate comparison of the relative values of the several commercial brands in use. All are water soluble and act briefly; hence their efficiency in stimulating growth will be greater when they are given in divided doses at short intervals (daily) than when they are used in similar total amounts at longer intervals (alternate days to weekly). The manufacturers of some of these products suggest interrupted periods of injection, as if to avoid antihormone formation. This interruption is not necessary. It has been frequently suggested that growth will be more rapid if the injection of pituitary extract is augmented by feeding thyroid. This has been demonstrated in animals.[5] Caution is enjoined at this point, for promotion of growth is often undertaken as a late attempt to achieve normal stature before the epiphyses close, and thyroid therapy will certainly tend to expedite the maturing of the skeleton, which includes the union of epiphyses. It is therefore advised that except under most careful observation of the bones thyroid be avoided in treating dwarfism with pituitary extracts, unless there is evidence of hypothyroidism. Therapy for dwarfism should be continued for a minimum of three months to detect the beginning of results before it is abandoned as of no avail. When growth response is secured, the injections should be pursued until the stature is that desired for the age or until no gain is secured for at least three months and films of the femur show the epiphyses to be firmly united.

Pituitary Cachexia.—The failure of the anterior lobe of the pituitary to secrete the growth factor in adult life has not yet been definitely associated with any syndrome. It is usually assumed that pituitary cachexia (Simmonds' disease) is the consequence of a complete failure of the anterior lobe, with failure of all pituitary functions. The diagnostic confusion between anorexia nervosa and pituitary cachexia makes antemortem diagnosis uncertain. The reported results of the treatment of patients for these conditions are conflicting.[6] Benefits have been claimed for the use of various types of pituitary extracts and placental extracts, for other endocrine therapy, and for improvement of nutrition as well as for psychotherapy. Until the diagnostic riddle can be solved, therapy will remain uncertain. It is noteworthy that those who claim the best results

3. Kirklin, O. L., and Wilder, R. M.: Follicular Hormone Administered in Acromegaly, Proc. Staff Meet., Mayo Clin. **11**: 121-125 (Feb. 19) 1936.

4. Lee, M. O., and Schaffer, N. K.: Anterior Pituitary Growth Hormone and the Composition of Growth, J. Nutrition **7**: 337-363 (March) 1934.

5. Smith, P. E.: Increased Skeletal Effects in Anterior Pituitary Growth-Hormone Injection by Administration of Thyroid in Hypophysectomized Thyroparathyroidectomized Rats, Proc. Soc. Exper. Biol. & Med. **30**: 1252 (June) 1933.

6. Dick, G. F., and Dine, W. D.: Pituitary Extract in Simmonds' Disease, Endocrinology **22**: 703-707 (June) 1938. Richardson, H. B.: Simmonds' Disease and Anorexia Nervosa, Arch. Int. Med. **63**: 1-28 (Jan.) 1939.

for psychotherapy and improved nutrition admit that some patients may regain normal weight and be socially rehabilitated but still show amenorrhea or other evidences of great reduction in gonadal function. This leaves presumptive evidence of pituitary hypofunction. Therefore the recent attempts to use endocrine therapy for pituitary cachexia have included administration of such diverse materials as growth-promoting pituitary extracts, gonadotropic substances, adrenal cortex extracts and desiccated thyroid. Obviously this, again, is an experimental field, in which dependable results cannot yet be expected.

DYSFUNCTION IN SUPPLY OF GONADOTROPIC HORMONES

Hypersecretion.—The only condition associated with excessive amounts of anterior pituitary gonadotropic hormones is the climacteric, whether occurring spontaneously or as the consequence of surgical ablation or irradiation of the gonads. There is no evidence that the occurrence of increased amounts of the gonadotropic hormones in the pituitary,[7] the blood or the urine[8] of such patients has any significance for the comfort or health of the patients. It was formerly thought that the relief from typical autonomic disturbances of the climacteric depended on the inhibition of this increased anterior lobe secretion.[9] It has been shown that such inhibition does not occur following the administration of doses of estrogen which provide relief[10] and that complete alleviation of the symptoms is totally unrelated to the presence of the typical climacteric level of gonadotropic substances in the urine. Therefore it is suggested that there is no clinical reason to attempt treatment of hypersecretion of the anterior pituitary gonadotropic hormones as such.

Hypogonadism in the Male.—The discussion of testicular disorders in another chapter[11] provides details which need not be repeated. There are three fundamental types: infantilism, adiposogenital dystrophy and cryptorchism. Infantilism is the simple failure of testes to develop, and the therapy is commonly the use of gonadotropic substances. Adiposogenital dystrophy includes in addition to infantilism evident obesity, which is frequently but not always most marked about the lower part of the torso and the trochanteric region. The therapy required here is appropriate dietary reduction of weight plus a gonadotropic substance. In a few cases the reduction of weight has sufficed without endocrine therapy. This may mean that the adolescent development was delayed but eventually appeared, or it may indicate that the reduction in weight achieved some favorable alteration in the endocrine situation. The latter suggestion is entirely hypothetic. Obesity accentuated about the lower part of the abdomen and the trochanteric region but without hypogonadism is not justification for a diagnosis of adiposogenital dystrophy. Such obesity deserves treatment by dietary limitation and exercise but not by use of gonadotropic substances. Cryptorchism may be due to anatomic barriers to testicular descent, in which case the only endocrine problem is the reduced activity of a testicle which is not in the scrotum. That problem is dealt with elsewhere.[11] There are numerous cases in which delayed descent is associated with infantilism or with adiposogenital dystrophy. It is especially these patients who may benefit from endocrine therapy with the double purpose of accomplishing descent and stimulating development.

As explained by Engel,[12] there are three fundamentally different types of gonadotropic substances available for therapy: anterior pituitary extracts, concentrates from the serum of pregnant mares and concentrates from the urine of pregnant women. The last of these was the first to be used clinically, and it is still recognized as a potent stimulator of the interstitial tissue of the testicle, in response to which the testicle enlarges, the production of testosterone is increased, secondary sex characters are intensified, the genitalia are enlarged, and cryptorchid testes descend unless there is an anatomic barrier. Consequently there have been numerous reports of treatment of cryptorchism with this chorionic gonadotropin. The limitations of this method are discussed by Thompson and Heckel.[13] The dosage employed by them and by Zelson[14] is from 100 to 1,000 units administered from three to seven times weekly. Positive results are to be expected in three months or less. The therapy should be watched carefully to avoid producing genitalia larger than normal for the age. The procedure is more frequently successful with bilateral cryptorchism, in the presence of other evidences of endocrine deficiency and before the age of 15. One great merit of such treatment is that it secures descent in that group of boys who do not require surgical treatment and, by failures, marks out for surgical intervention at an early age those who will require it.

Observations on boys treated with chorionic gonadotropin have led to the conviction that this substance does not stimulate all testicular functions. Spermatogenic tissue shows little response. Animal experiments show that anterior pituitary extracts or concentrates from the serum of pregnant mares will stimulate both interstitial and spermatogenic tissues. Therefore I consider it wiser to treat infantilism over long periods of time with one of these two gonadotropic materials, both of which are now available commercially. There is as yet no agreement about the methods of standardizing anterior pituitary gonadotropic extracts; hence the manufacturers' recommendations as to dosage will vary. The pregnant mare serum extracts will all appear in terms of an international unit during 1940, and the dosages will probably vary from 50 to 300 units given daily or on alternate days. Since these substances are water soluble, act quickly and for brief periods, they should be given at short intervals for maximum effect per unit. Since there is no recognized cycle of testicular growth or activity, these treatments may well be pursued without interruption until results are achieved. So little has been reported about the results of such treatment that prediction of the probable degree of success is uncertain.

Hypogonadism in the Female.—The discussion of ovarian dysfunctions and their treatment by Fluhmann[15] includes the varieties of underactivity of the

7. Witschi, E., and Riley, G. M.: Quantitative Studies on the Hormones of Human Pituitaries, Endocrinology **26**: 565-576 (April) 1940.
8. Fluhmann, C. F.: Anterior Pituitary Hormone in Blood of Women: Preliminary Clinical Classification of Results in Non-Pregnant Individuals, Endocrinology **15**: 177-183 (May-June) 1931.
9. Jeffcoate, T. N. F.: Estrogenic Hormone Therapy, Brit. M. J. **2**: 671-676 (Sept. 30) 1939. Sevringhaus, E. L.: Endocrine Therapy in General Practice, Chicago, The Year Book Publishers, Inc., 1938, pp. 155-156.
10. Heller, C. G., and Heller, E. J.: Gonadotropic Hormone: Urine Assays of Normally Cycling, Menopausal, Castrated, and Estrin Treated Human Females, J. Clin. Investigation **18**: 171-178 (March) 1938.
11. Section II, B, 1 and 2 of outline for book "Glandular Physiology and Therapy."
12. Section I, 6 of outline for book "Glandular Physiology and Therapy."
13. Thompson, W. O., and Heckel, N. J.: Undescended Testes: Present Status of Glandular Treatment, J. A. M. A. **112**: 397-403 (Feb. 4) 1939.
14. Zelson, C.: Treatment of Cryptorchidism with Gonadotropic Substance, J. Pediat. **14**: 452-461 (April) 1939.
15. Fluhmann, C. F.: Ovarian Dysfunctions and Their Treatment, Section II, A, 6 of outline for book "Glandular Physiology and Therapy."

ovaries, their diagnosis and their therapy. When there is no evidence of primary disorder in the ovaries or of obvious disturbance from some other morbid process in the body, these ovarian hypofunctions are assumed to be a result of hypofunction of the anterior lobe of the pituitary in secreting gonadotropic hormones. Exact proof of this relation awaits far more study by hormone assays than is yet possible. The variety of clinical expressions of hypofunction is not surprising when one considers the three ovarian functions of ovulation, production of estrogen and production of progesterone, the last two of which may vary widely in intensity or duration. Further variables are the time and intensity of secretion of the two anterior pituitary gonadotropic hormones—the follicle-stimulating and the luteinizing hormone. That there is interaction of pituitary hormones on the ovaries and of ovarian hormones on the pituitary cannot be doubted. Knowledge of the quantitative relationships is essential to any completely rational therapy, as well as to diagnosis. At present endocrinologists have only the roughest ideas about these exact processes. Therefore therapy with gonadotropic materials is still crude.

The earliest therapy was with chorionic gonadotropin, but those who were previously enthusiastic have come to realize that the substance produced during pregnancy by chorionic tissue does not stimulate the ovaries of nonpregnant women to develop, to ovulate or to secrete more estrogen.[16] Stimulation of these functions has, however, followed the use of anterior pituitary extracts and concentrates from the serum of pregnant mares. Therefore these materials appear to be the only appropriate ones with which to stimulate hypofunctioning human ovaries. Chorionic gonadotropin is apparently a factor in sustaining the function of the corpus luteum during the first trimester of pregnancy, yet, curiously, there have been no systematic studies of the effect of this substance in the treatment of repeated abortion. This most obvious use of the chorionic gonadotropin might well be explored by gynecologists and obstetricians.

In recent years repeated abortion has been treated chiefly by the employment of progesterone. Although the gonadotropin in pregnant mare serum is probably chorionic in origin, it simulates anterior pituitary gonadotropin very closely. It is not yet justifiable to assume that mare serum concentrate provides a complete substitute in replacement therapy for human hypopituitarism.

In treating girls or women whose ovaries are to be stimulated, it is recommended [17] that small or moderate amounts be administered hypodermically at intervals of one or two days and that each course of injections be not longer than two weeks. The optimum time for such a course is the first two weeks of the menstrual cycle, when the development of a new follicle and growth of a new ovum normally occur. Interruption of the series of doses is advised to avoid continuous stimulation with small amounts of gonadotropin, which is believed to be the cause of polycystic ovaries. In those women who are amenorrheic or whose menses occur at longer intervals than two months without treatment, it may be wise to repeat such a course of pituitary injections, beginning every three weeks, until some semblance of cyclic function is established. The gage of success in such a program may be symptomatic improvement, restoration of more regular menstrual cycles, improved fertility or evidence of improvement in the endometrium or in the vaginal mucosa. Both diagnosis and therapy are rendered far more certain when treatment is preceded by biopsy of the endometrium [18] and study of stained smears of desquamated epithelium from the vagina.[19] A detailed study of each case is essential to early determination of the probable success of treatment.[20]

The frequency of anovulatory menstruation as a cause of irregularity of cycles, reduced fertility and glandular cystic hyperplasia of the endometrium has led to efforts to stimulate the ovaries to ovulation. The results of Hisaw and co-workers [21] suggested that this was to be accomplished by intravenous injection of a mixture of follicle-stimulating and luteinizing anterior pituitary extracts followed for several days by sustained hypodermic use of the same materials to stimulate secretion by the corpus luteum. This procedure has been tried by several investigators,[22] and a complete program of therapy has been reported by Siegler and Fein [23] with some promise of success. The most acceptable material is the concentrate of pregnant mare serum, which is given in doses of 100 to 300 international units hypodermically for several days to stimulate follicle development, followed by a single intravenous dose of 1,000 to 1,500 units to initiate ovulation, and then by four to six days more of hypodermic therapy to sustain function in the corpus luteum if ovulation occurs.

Since endocrinologists have no knowledge of the amount of gonadotropic hormone produced by the anterior lobe of the pituitary during health, they cannot tell how much is required for replacement therapy in deficiencies. Clinical results certainly indicate that even with the most potent commercial extracts 1.0 cc. daily cannot be regarded as a complete replacement for the secretion of the anterior lobe of the human pituitary. Owing to local reactions to the protein content of even the best preparations and to the cost of therapy, such treatment cannot be expected to be helpful save in the relief of partial deficiencies. If hypopituitarism resembles in chronicity hypothyroidism, diabetes mellitus or hypofunction of the adrenal cortex—a reasonable supposition in many ways—one must expect to use anterior lobe replacement therapy for months or years, not for just a few days. The paucity of cases in which gonadotropic therapy has been attended by striking success should not cause the clinician to doubt the ultimate importance of such treatment, although he may well decide to wait for better diagnostic methods, more potent and less expensive extracts and reports of longer periods of observation of patients now under treatment. Gonadotropic therapy is still in the experimental stage.

16. The Present Status of Therapy with Chorionic Gonadotropin, report of the Council on Pharmacy and Chemistry, J. A. M. A. **114**: 487-489 (Feb. 10) 1940.

17. Campbell, R. E., and Sevringhaus, E. L.: Pituitary Gonadotropic Extracts for Treatment of Amenorrhea, Menorrhagia, and Sterility, Am. J. Obst. & Gynec. **37**: 913-928 (June) 1939.

18. Campbell, R. E.; Lendrum, F. C., and Sevringhaus, E. L.: Endometrial Histology and Pathology as Revealed by Biopsy Method, Surg., Gynec. & Obst. **63**: 724-731 (Dec.) 1936.

19. Papanicolaou, G. N., and Shorr, Ephraim: Action of Ovarian Follicular Hormone in the Menopause, as Indicated by Vaginal Smears, Am. J. Obst. & Gynec. **31**: 806-831 (May) 1936. Geist, S. H., and Salmon, U. J.: Evaluation of Human Vaginal Smear in Relationship to Histology of the Vaginal Mucosa, ibid. **38**: 392-399 (Sept.) 1939. Sevringhaus, E. L.: Treatment of Gonadal Hypofunction, Bull. New York Acad. Med. **16**: 53-82 (Feb.) 1940.

20. Sevringhaus, E. L., and Campbell, R. E.: Endocrinopathic Amenorrhea: Causes and Treatment, Am. J. Surg. **48**: 197-204 (April) 1940.

21. Hisaw, F. L.: Physiology of Menstruation in Macacus Rhesus Monkeys, Am. J. Obst. & Gynec. **29**: 638 (May) 1935.

22. Davis, M. E., and Koff, A. K.: Experimental Production of Ovulation in Human Subjects, Am. J. Obst. & Gynec. **36**: 183-189 (Aug.) 1939.

23. Siegler, S. L., and Fein, M. J.: Studies in Artificial Ovulation with the Hormone of Pregnant Mares' Serum, Am. J. Obst. & Gynec. **38**: 1021-1036 (Dec.) 1939.

SUPPLY OF MAMMATROPIC HORMONE

The use of anterior pituitary extracts which are known to stimulate lactation by well developed mammary glands has not proved dependably successful in human subjects.[24] Details of experimental work on this problem are discussed in another chapter.[25] There is reason to hope for progress in this field of therapy. Better results have been achieved in the use of estrogens to prevent or interrupt lactation when clinical indications make this step advisable. For this purpose the patient is treated with high doses of estrogen, given intramuscularly, and the therapy should be successful within one to three days; if it is not, it should be stopped. Dosages have been reported as from 1 to 10 mg. of estrone (theelin) or estradiol benzoate per day. After the first few days there appears to be no need for further therapy. This suggests that the mammatropic hormone secretion which initiates lactation post partum is quickly reduced by therapy to a level which is ineffective in continuing secretion by the breasts. Success has been reported following oral use of 10,000 rat units of estradiol daily in divided doses for from one to four days.[26] The injection of testosterone propionate, 10 to 25 mg., twice daily for one or two days has also been found successful.[27] These methods do not require any additional application of local therapy to the breasts, nor do they cause complications or pain. It is believed that these varied types of endocrine therapy for suppression of lactation operate by inhibition of the secretion of the mammatropic hormone by the anterior lobe of the pituitary.

Council on Physical Therapy

THE COUNCIL ON PHYSICAL THERAPY HAS AUTHORIZED PUBLICATION OF THE FOLLOWING ARTICLE.

HOWARD A. CARTER, Secretary.

RADIOTHERAPY FOR INFLAMMATORY CONDITIONS

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The treatment of inflammatory processes with roentgen rays is far from new. Indeed, it goes back to about 1900. The earliest mention of the subject is to be found in papers by Freund,[1] Albers-Schönberg,[2] Gautier,[3] Rudis-Jicinsky[4] and Pusey,[5] and in the books of Williams[6] and Belot.[7] An interesting point is that some of the earliest therapeutic trials were made in this country, but they received no attention until the successful results had been repeatedly confirmed by others here and abroad.

Many physicians are unaware of the favorable influence of roentgen rays or radium on various forms of acute or chronic inflammation. Yet the therapeutic value of irradiation in inflammations has been thoroughly substantiated, and the testimony is so generally favorable that one wonders why it is not used more than it is or why, in many cases, it is employed only after other therapeutic measures have failed to yield the desired results. Perhaps the very multiplicity of inflammatory lesions for which radiotherapy has been claimed to be effective has led to a natural skepticism. Also the many explanations which have been advanced to account for the favorable action of roentgen rays or radium on inflammations have probably led many physicians to discredit the evidence or to ascribe the favorable reports to enthusiasm or to psychic factors. Indeed, without a convincing explanation it would be difficult to believe that the same agent could be therapeutically effective against so many different forms of inflammation. And yet the reason appears to be simple and to rest on abundant experimental evidence.

Others who have heard or read of the therapeutic possibilities of irradiation in inflammatory processes hesitate to make use of the method because they fear deleterious effects on the skin or gastrointestinal disturbances such as are observed in connection with the treatment of malignant tumors. When treating neoplasms the aim is to deliver the largest dose compatible with the integrity of the surrounding tissues. When treating inflammatory lesions, on the contrary, only small or moderate doses are employed. Doses that might strain the tolerance of the skin are unnecessary and should be avoided as potentially dangerous. For acute inflammations, especially, the doses required are so small that the skin or the gastrointestinal tract cannot be affected.

ACUTE INFLAMMATION

Many varieties of acute inflammation yield rapidly to a small dose of roentgen rays. By a small dose is meant one representing less than half the tolerance dose of the skin; a dose as small as a fourth of the so-called erythema dose, or even less, is often sufficient, but this may vary somewhat according to the character and stage of the lesion in a given case. A significant point is that the more acute the inflammation, the smaller is the dose of rays required. With such small doses there can be no question of cutaneous or systemic reaction; therefore, weak and febrile patients can be treated without danger. In most cases a single exposure is sufficient, but occasionally it may be advisable to repeat the treatment a few days later. This is particularly true when the initial dose has been exceptionally small or when the region treated has not been wide enough.

Among the acute inflammatory conditions in which the therapeutic value of irradiation has been established are furuncle, carbuncle, abscess, cellulitis and phlegmon, onychia and paronychia, acute adenitis, pneumonia, acute parotitis and erysipelas. In other forms of acute inflammation, such as sinusitis, otitis and mastoiditis, pelvic infection, osteomyelitis and gas bacillus infection, an increasing body of evidence indicates an equally favorable response in many cases.

24. Stewart, H. L., Jr., and Pratt, J. D.: Effect of Prolactin on Mammary Gland Secretion, Endocrinology **25**: 347-353 (Sept.) 1939.

25. Section I, 5 of outline for book "Glandular Physiology and Therapy."

26. Foss, G. L., and Phillips, P.: Suppression of Lactation by Oral Estrogen Therapy, Brit. M. J. **2**: 887-890 (Oct. 29) 1938.

27. Kurzrok, Raphael, and O'Connell, C. P.: Inhibition of Lactation During Puerperium by Testosterone Propionate, Endocrinology **23**: 476-478 (Oct.) 1938.

From the Section on Therapeutic Radiology, the Mayo Clinic.

1. Freund, L.: Ein mit Röntgen-Strahlen behandelter Fall von Naevus pigmentosus pilliferus, Wien. med. Wchnschr. **47**: 428-434, 1897.

2. Albers-Schönberg: Beitrag zur therapeutischen Verwendung der Röntgenstrahlen in der Behandlung des Lupus, Fortschr. a. d. Geb. d. Röntgenstrahlen **1**: 72-75, 1897-1898.

3. Gautier: Traitement de l'acné et de la couperose par les rayons X, Cong. internat. de méd. **4**: 385, sect. 8, 1899.

4. Rudis-Jicinsky, J.: Lupus Treated by X-Rays, Am. X-ray J., 1898, p. 423.

5. Pusey, W. A.: Lupus Healed with Roentgen Rays: Report of Case, J. A. M. A. **35**: 1476-1478 (Dec. 8) 1900.

6. Williams, F. H.: The Roentgen Rays in Medicine and Surgery as an Aid in Diagnosis and as a Therapeutic Agent; Designed for the Use of Practitioners and Students, New York, Macmillan Company, 1903.

7. Belot, Joseph: La radiothérapie, son application aux affections cutanées, Paris, 1904, No. 426.

Pyogenic Infection.—When irradiated early, during the stage of maximal leukocytic infiltration, many lesions due to pyogenic cocci do not suppurate; their evolution is arrested and they undergo spontaneous resolution. Therefore, the treatment is most effective when other methods of treatment are least effective; it is painless and does not interfere with the activities of the patient. Pain is often relieved in a few hours, but sometimes the relief may be preceded by exacerbation for a brief period. Hot or other dressings are often unnecessary, or the period during which they must be applied is shortened. Treatment after suppuration has set in tends to hasten the suppurative process, the duration of which may thus be more or less diminished. Hence the patients should be kept under close observation so that, if necessary, the surgeon may provide adequate drainage at the proper time. But acute pyogenic inflammations do not always respond so favorably; in a minor proportion of cases they yield little or not at all. This is especially true when the treatment is started long after the onset, that is, late in the course of the inflammation, when exudates have undergone organization and when some degree of connective tissue proliferation has occurred.

Pneumonia.—As early as 1905 and 1906 Musser and Edsall [8] and Edsall and Pemberton [9] observed and reported the strikingly favorable influence of a small dose of roentgen rays in four cases of delayed resolution of lobar pneumonia. Every other therapeutic measure having failed to improve the pulmonary condition of the patients, roentgen irradiation was tried as a last resort. Within twenty-four hours after exposure, resolution of the pneumonic exudate set in and proceeded rapidly, and the patients recovered. These observations were subsequently confirmed by A. J. and W. A. Quimby [10] and by Krost [11] and Torrey.[12] In fact, the Quimbys were so impressed by the rapid influence of irradiation in ten cases that they were impelled to testify that "no pathologic process in the body responds quicker to an x-ray exposure than the nonresolution following pneumonia." Since then Heidenhain and Fried,[13] Holzknecht,[14] Merritt and McPeak [15] and others have observed favorable action of roentgen rays on postoperative pneumonia as well as on pneumonia unrelated to surgical intervention, in a large percentage of cases in which the treatment was employed. Naturally the best results are to be obtained from early treatment. As pointed out by Musser and Edsall, irradiation cannot be expected to have much effect once the pneumonic inflammation has become organized or when the treatment is given shortly before impending death.

Acute Parotitis.—Every surgeon is aware of the sinister character of that form of acute parotitis which arises as a complication of certain operations, especially those on the large intestine, and of the high mortality associated with it. The first record of the favorable effect of irradiation on this disease appears to have been made by Heidenhain,[16] who found that the inflammation reacted much as do other acute inflammatory processes. Rankin and Palmer [17] found that a moderate dose of radium, applied soon after the onset, caused the inflammation to subside in most cases within twenty-four to forty-eight hours. Moreover, suppuration usually did not occur and the mortality was correspondingly reduced. Radium is sometimes preferable because the treatment can thus be given without disturbing the patient. When portable roentgen therapeutic apparatus is available, however, treatment with roentgen rays is preferable because the necessary dose can be given in much less time than with radium.

Erysipelas.—When erysipelas does not complicate diabetes or nephritis, roentgen irradiation is usually followed by prompt abatement of the fever and recession of the lesions. This is especially true when the patients are adults and when the treatment is given early. In children, for some unknown reason, the disease does not respond quite so well. In some cases, after an initial period of improvement the inflammation may again become active and additional treatment may be required to arrest the process. When this happens it is usually because the initial treatment was confined too closely to the apparent limits of visible involvement. Too much stress cannot be laid on the importance of including in the field of irradiation a wide zone of apparently normal tissue around the lesion. A single dose, corresponding to 100 or 200 roentgens of roentgen rays, generated at 130 or 140 kilovolts and filtered through 4 mm. of aluminum, is usually sufficient.

Favorable results may also be obtained by exposing the affected region to an erythema or blistering dose of ultraviolet rays. A possible disadvantage is that during the period of cutaneous reaction to treatment it may be difficult to know what is disease and what represents reaction. Roentgen irradiation has no such disadvantage; the dose required does not cause reactive inflammation.

Other Acute Inflammations.—Other acute inflammations have been found to yield equally well to roentgen irradiation. Among these may be mentioned acute otitis and acute sinusitis. Some years ago Granger [18] reported that in certain cases of acute mastoiditis in which the mastoid region had been exposed to small doses of roentgen rays for diagnostic purposes the inflammation had subsided and an operation had been unnecessary. Other favorable reports have appeared since then. Acute osteomyelitis also has been found to respond favorably. As in other acute inflammations, the best results have been obtained when the lesions were treated early.

In 1936 Kelly and Dowell [19] reported that favorable results had been obtained in cases of gas bacillus infection. Since then these authors have published several additional reports based on a larger number of

8. Musser, J. H., and Edsall, D. L.: A Study of Metabolism in Leukemia Under the Influence of the X-Rays with a Consideration of the Manner of Action of the X-Rays and of Some Precautions Desirable in Therapeutic Use, Tr. A. Am. Physicians **20**: 294-323, 1905.

9. Edsall, D. L., and Pemberton, Ralph: The Use of the X-Rays in Unresolved Pneumonia, Am. J. M. Sc. **132**: 286-297 (Feb.) 1907.

10. Quimby, A. J., and Quimby, W. A.: Unresolved Pneumonia: Successful Treatment by Roentgen Ray, New York State J. Med. **103**: 681-683 (April 8) 1916.

11. Krost, G. N.: Unresolved Pneumonia in Children: Treatment with Roentgen Rays, Am. J. Dis. Child. **30**: 57-71 (July) 1925.

12. Torrey, R. G.: Roentgentherapy in Disorders of the Respiratory Tract, Particularly Those Associated with Enlargement or Persistence of the Thymus Gland, and Those Associated with Unresolved Pneumonic Exudates, S. Clin. North America **7**: 221-235 (Feb.) 1927.

13. Heidenhain, Lothar, and Fried, Carl: Röntgenbestrahlung und Entzündung, Arch. f. klin. Chir. **133**: 624-635 (April) 1924; Klin. Wchnschr. **3**: 1121-1122 (June 17) 1924.

14. Holzknecht, Guido: Roentgen Treatment of Spontaneous Posttraumatic and Postoperative Coccus Infections and Suppurations, Am. J. Roentgenol. **15**: 332-336 (April) 1926.

15. Merritt, E. A., and McPeak, E. M.: Roentgen Irradiation in Unresolved Pneumonia, Am. J. Roentgenol. **23**: 45-48 (Jan.) 1930.

16. Heidenhain, Lothar: Röntgenbestrahlung und Entzündung, Strahlentherapie **24**: 37-51, 1926.

17. Rankin, F. W., and Palmer, B. M.: Postoperative Parotiditis: Treatment Without and With Radium, Ann. Surg. **92**: 1007-1013 (Dec.) 1930.

18. Granger, Amédée: The Treatment of Infections of the Mastoids of Infants, When There Is No Sign of Destruction Present, with Fractional Doses of the Roentgen Rays, New Orleans M. & S. J. **84**: 111-113 (Aug.) 1931.

19. Kelly, J. F., and Dowell, D. A.: Present Status of the X-Rays as an Aid in the Treatment of Gas Gangrene, J. A. M. A. **107**: 1114-1118 (Oct. 3) 1936.

cases. According to them the only patients who died were those in whom an affected extremity had been amputated. The number of cases included in their latest report is now sufficient to command attention, especially since they appear to have succeeded in reducing the mortality to less than 10 per cent when amputation was necessary and to less than 5 per cent when it was not.[20] If the experience of others should confirm the results obtained by Kelly and Dowell, roentgen therapy might be shown to be a great boon to patients afflicted with this virulent form of infection.

In treating inflammations caused by such virulent bacteria, Kelly and Dowell have found it advantageous to use doses as small as 100 roentgens and to repeat them daily or twice daily for three or four days. Although the reason why this procedure is more effective is not clear, it is possible that when the infecting bacteria have a high degree of virulence a single irradiation does not influence a sufficient number of circulating leukocytes to overcome the infection. But when irradiation is repeated daily or twice a day for three or four days, the number of leukocytes acted on by the rays must necessarily be much greater, and this may account for the greater efficacy of this method in the treatment of gas bacillus infection. As streptococcic infections often assume a virulent form and leukocytic infiltration is often slight or wholly lacking, it is possible that the same method of small doses repeated daily or twice daily for three or four days would have a similar advantage.

CHRONIC INFLAMMATIONS

For years it has been known that many forms of chronic inflammation are favorably influenced by roentgen irradiation. Among these may be mentioned numerous varieties of chronic inflammation of the skin in which the therapeutic value of radiotherapy is conceded by experienced dermatologists. Other chronic inflammatory processes which may be cited are tuberculous adenitis, peritonitis, keratitis and iritis, actinomycosis and blastomycosis, trachoma in its early stages, and active infectious arthritis. Two factors which influence the effect of irradiation are that the dose of roentgen rays must be larger than that used for acute inflammations and that treatment must be repeated at intervals for some time. By a larger dose is meant a dose varying between 50 and 80 per cent of the tolerance dose when given at one time or, in international units, between 300 and 500 roentgens, according to the conditions of irradiation. Rays generated at 120 or 140 kilovolts and filtered through 4 or 6 mm. of aluminum are usually adequate. Rays generated at higher potentials can be used with approximately equal effect. For skin diseases, unfiltered rays or rays filtered through 2 mm. of aluminum and generated at 80 or 100 kilovolts are generally preferable. The treatment of chronic inflammatory lesions with maximal (erythema, tolerance or tumor) doses is bad practice and should be avoided as potentially dangerous. Since treatment must be repeated at intervals for varying periods, the use of maximal doses may lead to undesirable effects or, by superimposing a reactive inflammation, may cause the original inflammation to spread rather than to abate.

Tuberculous Processes.—Although considerable variation may be observed in different cases, the effect of irradiation on tuberculous processes is characteristically slow. In tuberculous adenitis the affected region must be irradiated every three or four weeks for from three to twelve months. When calcification is absent, the inflamed nodes gradually recede and may disappear completely or may remain as small fibrous granules. Unless abundant, caseous material may be absorbed or may be replaced by calcium. When suppuration occurs drainage may be advisable, but sometimes the pus can be withdrawn through a needle of large bore, which should be introduced not through the thinnest part of the fluctuant region but to one side through more substantial tissue, so as to avoid the formation of a sinus. The extensive surgical procedures formerly in vogue are now seldom necessary. The resolution of tuberculous lesions appears to be hastened by supplementing periodic roentgen irradiation with daily exposure of the entire body to graduated doses of sunlight or to ultraviolet rays generated artificially. Ultraviolet irradiation confined to the affected region is usually a waste of time.

Much the same may be said of tuberculous peritonitis. An important consideration is that the entire abdominal cavity should be irradiated as uniformly as possible. This can best be done by dividing the anterior half of the abdomen from the level of the diaphragm to that of the pubic region into four fields, with the navel as the common center; the posterior half should be divided into four corresponding fields.

Radiotherapy is also an effective method of treating tuberculosis of the cornea or iris. The lesions recede more rapidly after exposure to roentgen rays than do similar lesions in other parts of the body. The dose of roentgen rays should never exceed three fourths of a minimal erythema dose; a larger dose, especially for children, may lead to epithelial degeneration of the crystalline lens and to cataract formation.

Actinomycosis; Blastomycosis.—When actinomycosis affects the face, mouth or other superficial structures, roentgen or radium irradiation, supplemented by the internal use of large doses of iodides and sometimes by simple surgical drainage of an abscess, is the most effective therapeutic measure, and a large proportion of patients can thus be permanently cured.

Not infrequently, actinomycotic inflammation arises in the intestine, especially the lower part of the small intestine, where it is often mistaken for simple or suppurative appendicitis. In many cases one or more operations are performed and the true character of the process is not recognized. This is unfortunate because, if the lesion is actinomycotic in character, exploratory maneuvers or any measures beyond simple drainage of an abscess serve only to spread the infection. Thorough exposure of the entire abdomen (front and back) to about three fourths of an erythema dose of roentgen rays, repeated every three or four weeks, may be followed by substantial improvement and sometimes by complete and permanent cure. But when the infection has extended to the respiratory tract (bronchi, lungs and pleura), more than slight and temporary improvement is not likely to be obtained with any method of treatment.

Trachoma.—Trachoma is characterized by conjunctival granulations composed largely of lymphocytes. These granulations are gradually replaced by connective tissue, and the eyelids become sclerosed and distorted. As early as 1902 and 1903, Mayou,[21] Stephenson and

20. Kelly, J. F.; Dowell, D. A.; Russum, B. C., and Colien, F. E.: The Practical and Experimental Aspects of the Roentgen Treatment of Bacillus Welchii (Gas Gangrene) and Other Gas-Forming Infections, Radiology **31**: 608-619 (Nov.) 1938.

21. Mayou, Stephen: A Case of Trachoma Treated by X-Rays, Tr. Ophth. Soc. U. Kingdom **22**: 95-96, 1902; The Treatment of Trachoma by the X-Rays, ibid. **23**: 10-23, 1903.

Walsh [22] and Cassidy and Rayne [23] made the discovery that, in some cases, the trachomatous granulations receded after exposure to roentgen rays and that the patients were cured. Subsequently Thielemann,[24] Cochard [25] and Meldolesi and Sabbadini [26] confirmed the favorable influence of radiotherapy. Sometimes the lesions recurred later, but resumption of treatment caused them to retrogress and disappear; this probably meant that the initial treatment had not been continued long enough. The evidence furnished by the group of writers last mentioned indicates that the action of the rays is greatest during the early stages of the granular form of the disease and least during the late stages, when the granulations have been replaced by connective tissue.

Chronic Arthritis.—In many cases roentgen irradiation relieves pain and reduces swelling, and the functional disability diminishes. As might be expected, the degree of improvement varies considerably with different patients. The best results require repeated treatment and are obtained in cases in which the inflammation is active. Incidentally, a useful indication of active inflammation is tenderness. When the inflammatory deposits have become largely or completely organized, little improvement is to be expected. Of course, focal infection and other abnormalities must not be neglected, irrespective of irradiation.

Bronchiectasis.—Recently Berck and Harris [27] reported having treated with roentgen rays thirty patients with bronchiectasis, of whom nineteen are said to have derived more or less pronounced improvement. Here again an opinion about the value of irradiation will have to await corroborative testimony. However, the care with which the cases appear to have been selected and the degree of improvement obtained in many of them make this report seem worthy of attention.

GENERAL

Quality of Rays.—The quality of the rays is of secondary importance. Favorable results can be obtained with rays generated at 100, 140 or 200 kilovolts. If in most cases the results obtained with rays generated at 130 or 140 kilovolts seem superior to those obtained with rays generated at a high potential, this is almost certainly not due to any specific action of rays of different wavelength but probably to a difference in absorption by the inflamed tissues. A larger proportion of rays of medium wavelength than of rays of short wavelength is absorbed in the first few centimeters of tissue. Therefore, since the majority of the inflammatory conditions mentioned are near the surface, the advantage, so far as maximal absorption at the desired level is concerned, would seem to favor rays of medium wavelength. When the inflammation is deep in the thorax, rays of short wavelength might be preferable. However, since the most effective dose is small, this theoretical advantage is not an important factor.

One consideration cannot be stressed too much, and the inability of some radiologists to obtain satisfactory results is often due to their failure to realize its importance. This consideration is that, in chronic inflammations generally, treatment must be repeated at regular intervals for a variable period. Even after the lesions and symptoms have disappeared or have ceased to be active, it is wise to treat the patient once or twice more. The more chronic the lesion, the more essential is this precaution. As examples I need only cite tuberculous adenitis, peritonitis, arthritis and synovitis. The response of tuberculous lesions to roentgen irradiation varies considerably from one patient to another, but in general it is characteristically slow. When treatment is stopped too soon, what might have been an excellent and permanent result is spoiled; after a period of apparent arrest, the tuberculous process becomes active again and resumption of treatment may not be so effective as before. Greater persistence in the first instance is usually the best policy.

When dealing with acute or chronic inflammatory lesions, a most important point is that the concept of maximal, tolerance or tumor doses must be abandoned. Not only are they less effective, but they are actually dangerous. To employ such doses in treating inflammatory conditions constitutes a loss of electrical energy, a gross waste of time on the part of the personnel as well as that of the patient and an unwarranted increase in cost. But, still more important, there is danger of inducing in the affected tissues an inflammatory reaction independent of that which is already present, and this might readily lead to spread rather than resolution of the infection. The principles of sound treatment are thus violated. This probably explains why some radiologists have failed to obtain the favorable results which should follow proper treatment. Furthermore, the possibility of spreading the infection by excessive doses is not the only danger. Experiments on animals, carried out by Lacassagne and Vinzent,[28] have shown that, when acute inflammatory lesions induced by injecting Streptobacillus caviae into rabbits were exposed to doses of roentgen rays such as are used in the treatment of malignant processes, in a considerable proportion of animals sarcomas subsequently developed in the same region.

MODE OF ACTION

Acute Inflammations.—Numerous experiments have long since made it clear that most bacteria are not directly influenced to a perceptible degree by doses of roentgen days or radium such as are commonly employed in treating human beings. To attribute the favorable effect of irradiation to a bactericidal action of the rays, therefore, would be to maintain an untenable hypothesis. Certainly there is little ground for the assumption that irradiation increases the production of antibodies. On the contrary, the experiments of Hektoen [29] and of others indicate that irradiation tends to diminish the formation of antibodies. Nor does the evidence now available justify one in assuming that

22. Stephenson, Sydney, and Walsh, David: Short Note on the Cure of Trachoma by X-Ray Tube Exposure and by High Frequency Brush Discharges, Lancet **1**: 237 (Jan. 24) 1903.

23. Cassidy, H. F., and Rayne, F. C.: Trachome chronique très amélioré par les rayons X, Tr. Ann. d'électrobiol. **6**: 617-619, 1903.

24. Thielemann, Rudolf: Zur Wirkungsweise des Radiumbestrahlung auf die trachomatöse Bindhaut, Ztschr. f. Augenh. **14**: 559-569, 1905.

25. Cochard, M.: La radiothérapie du trachome, Thesis 128, Lyons, 1921.

26. Meldolesi, G., and Sabbadini, D.: Sulla terapia del tracoma con le raziazioni secondarie ottenute col metode del Ghilarducci, Radiol. med. **10**: 222, 1923.

27. Berck, Maurice, and Harris, William: Roentgen Therapy in Bronchiectasis, J. A. M. A. **108**: 517-522 (Feb. 13) 1937.

28. Lacassagne, A.: Tumeurs malignes provoquées, chez le lapin, par l'irradiation de foyers inflammatoires, Compt. rend. Acad. d. sc. **196**: 69-71 (Jan. 3) 1933; Conditions dans lesquelles ont été obtenus, chez le lapin, des cancers par action des rayons X sur des foyers inflammatoires, Compt. rend. Soc. de biol. **119**: 562-564 (Feb. 17) 1933; Cancers Produced in Rabbits by the Action of X-Rays on Inflammatory Lesions, Brit. J. Radiol. **6**: 689-691 (Nov.) 1933. Lacassagne, A., and Vinzent, R.: Action des rayons X sur un foyer infectieux local, provoqué chez le lapin par l'injection de Streptobacillus caviae, Compt. rend. Soc. de biol. **100**: 247-249 (Jan. 26) 1929; Sarcomes provoqués chez des lapins par l'irradiation d'abcès à Streptobacillus caviae, ibid. **100**: 249-251 (Jan. 26) 1929.

29. Hektoen, Ludvig: The Influence of X-Rays on the Production of Antibodies, J. Infect. Dis. **17**: 415-422 (Sept.) 1915; Further Studies on the Effects of the Roentgen Rays on Antibody Production, ibid. **22**: 28-33 (Jan.) 1918; Further Observations on the Effects of Roentgenization and Splenectomy on Antibody Production, ibid. **27**: 23-30 (July) 1920.

any difference in the quality of the rays has a direct effect on the result, but the quality of the rays may and probably does have an indirect effect because it influences the proportion of rays absorbed at different depths beneath the surface.

Any one who has had an extended experience with radiotherapy for acute inflammations cannot have failed to be impressed (1) by the prompt relief of pain and the rapid resolution of the lesions when treated early, as well as by the acceleration of suppuration in lesions treated later, (2) by the fact that acute inflammations of different kinds respond at about the same rate to a given dose when treated at a corresponding stage and (3) by the circumstance that a small dose of rays is sufficient to produce this effect. Since irradiation acts in the same way and in the same time on so many forms of acute inflammation, it seems logical to conclude that the lesions themselves must have some common factor. This factor appears to be the radiosensitiveness of certain cells which are a more or less prominent feature of the majority of acute inflammations.

Pyogenic infections in general are characterized by varying degrees of leukocytic infiltration. By accumulating leukocytes, chiefly lymphocytes, polymorphonuclear cells and eosinophils, around one or more clusters of bacteria, the body attempts to localize the infection, to destroy the invading organisms and to neutralize their toxic products. The leukocytic infiltration also appears to be nature's method of intensifying the production of antibodies. An additional factor is hyperemia, which facilitates the mobilization of leukocytes. Of some acute inflammations, especially those caused by streptococcic infection, local infiltration by leukocytes is not a prominent feature. Against infections of this kind the body apparently defends itself by a general reaction of the leukocytes in the circulating blood.

Experiments on a large number of animals of different species and observations on human beings of the effect of roentgen rays and radium on different kinds of cells and tissues have proved conclusively that each variety of cell has a specific range of sensitiveness to irradiation. Some are extremely sensitive, even to small doses, while others are not influenced by doses many times larger. Moreover, these experimental and clinical investigations have demonstrated that the most sensitive of all cells are the lymphocytes in the spleen, lymph nodes, lymph follicles, thymus gland, circulating blood and bone marrow. The polymorphonuclear and eosinophilic leukocytes are also sensitive, but their susceptibility to irradiation is slightly less than that of the lymphocytes. When the entire body of an animal is exposed to a moderate dose of roentgen rays or radium, the majority of the organs remain free from perceptible abnormalities, but the spleen, lymph nodes and intestinal lymph follicles show a destruction of lymphocytes, the degree of which varies according to the dose of rays and the interval between irradiation and microscopic examination.

As observed by Heineke,[30] the disintegration of lymphocytes was characterized by disorganization and fragmentation of the nuclear chromatin of the cells and by scattering of the fragments of chromatin between the remaining intact cells and in the spaces of the reticular stroma, where the fragments gathered into clumps or balls. Then the clumps or balls of degenerate chromatin were gradually taken up by some of the reticular cells, which assumed a phagocytic property and swelled as the amount of ingested chromatin débris increased. This was associated with a progressive reduction in volume of the affected lymphoid structures. Identical changes were observed in the lymphoid tissue of the vermiform appendix and in the bone marrow. The destruction of lymphocytes in the spleen and lymph nodes was often so great that most of the malpighian corpuscles or lymph follicles could be recognized only by the blood vessels and by the concentric arrangement of the stroma. A small percentage of lymphocytes appeared to resist the action of the rays. After a number of hours the phagocytic reticular cells (macrophages) themselves began to disappear. The chromatin débris ingested by the phagocytes appeared to undergo intracellular digestion because the number and size of the ingested fragments diminished steadily. Two or three days after irradiation, degenerative alteration of other cells, notably the polymorphonuclear leukocytes and eosinophils, also became perceptible, and many of these cells disappeared from the splenic pulp and bone marrow. From ten days to three weeks later, more or less regeneration of the lymphoid tissue became evident.

Since then, Heineke's results have been confirmed by many investigators, including Krause and Ziegler,[31] Fromme,[32] Hall and Whipple,[33] Warthin,[34] Tsuzuki,[35] and many others. Warthin's description of the effect of roentgen rays corroborated the observations of Heineke in every particular except that, by examining the tissue soon after irradiation. Warthin found unmistakable evidence of the disintegration of lymphocytes within fifteen minutes after exposure of the animals to the rays, and the cellular degeneration continued for several days. Similar effects have been obtained with radium. Other investigators have demonstrated that the lymphocytes in the circulating blood are equally sensitive to irradiation and that the circulating polymorphonuclear and eosinophilic leukocytes are only slightly less sensitive than the lymphocytes.

The rate at which the varieties of leukocytes mentioned are destroyed by irradiation under experimental conditions corresponds closely to the rate at which acute inflammations subside after exposure to a suitable dose of roentgen rays or radium. The only other cells in the body which are affected at anything like the same rate are the mucus-secreting epithelial cells in the salivary glands, in the bronchi and in the intestine; but since these cells could not play any part in the majority of inflammatory processes, they may be excluded from consideration.

In circumscribed inflammations the significant role of lymphocytes, polymorphonuclear cells and eosinophils in the defense of the organism against infection and the sensitiveness of these cells to irradiation make it appear likely that, when an inflammatory lesion is irradiated, the rays act mainly by destroying a proportion of the

30. Heineke, H.: Ueber die Einwirkung der Röntgenstrahlen auf Tiere, München. med. Wchnschr. **1**: 2090-2092 (Dec.) 1903; Zur Kenntnis der Wirkung der Radiumstrahlen auf tierische Gewebe, ibid. **2**: 1382-1384 (Aug. 2) 1904; Experimentelle Untersuchungen über die Einwirkung der Röntgenstrahlen auf innere Organe, Mitt. a. d. Grenzgeb. d. Med. u. Chir. **14**: 21-94, 1905.

31. Krause, Paul, and Ziegler, Kurt: Experimentelle Untersuchungen über die Einwirkung der Röntgenstrahlen auf tierisches Gewebe, Fortschr. a. d. Geb. d. Röntgenstrahlen. **10**: 126-182, 1906.

32. Fromme, G.: Ueber die allgemeine Wirkung der Röntgen- und Radiumstrahlen, Ztschr. f. Geburtsch. u. Gynäk. **79**: 579-613, 1917.

33. Hall, C. C., and Whipple, G. H.: Roentgen Ray Intoxication: Disturbances in Metabolism Produced by Deep Massive Doses of the Hard Roentgen Rays, Am. J. M. Sc. **157**: 453-482 (April) 1919.

34. Warthin, A. S.: An Experimental Study of the Effect of Roentgen Rays on the Blood-Forming Organs, with Special Reference to the Treatment of Leukemia, Internat. Clin. **4**: 243-277, 1906.

35. Tsuzuki, Masao: Experimental Studies on the Biological Action of Hard Roentgen Rays, Am. J. Roentgenol. **16**: 134-150 (Aug.) 1926.

leukocytes infiltrating the lesion or circulating in the blood vessels which supply the affected region. This view is corroborated by the rapidity with which the symptoms often abate and the physical signs disappear. Moreover, microscopic examination of irradiated inflammatory lesions has repeatedly shown destruction of leukocytes, especially lymphocytes, to be the outstanding feature observed. It seems logical to conclude, therefore, that destruction of leukocytes is the primary and direct effect of irradiation. As a result of the disintegration of infiltrating leukocytes the antibodies, ferments and other protective substances which these cells contained are liberated in the surrounding tissue spaces, where they become mixed with the tissue fluids. It is also probable, as the experimental evidence indicates, that the next step is an increase in phagocytosis by reticular cells which become macrophages. No doubt other intimate, secondary or indirect effects related to cell metabolism are produced, but the precise character and significance of these effects are not clear.

Since leukocytic infiltration is an outstanding factor in the defense against infection, the natural question is why destruction of a large number of leukocytes infiltrating such lesions may not do more harm than good. The only answer is that, after small or moderate doses, no one has yet submitted any evidence of ill effects. The influence of irradiation always has been favorable or the rays have failed to alter the course of the inflammatory process.

From the foregoing considerations, therefore, it seems not unreasonable to assume that irradiation, by destroying some of the infiltrating leukocytes, causes the protective substances in these cells to be liberated and to be made even more readily available for defensive purposes than when they were in the intact cells. This and the increase in phagocytosis which follows the disintegration of the cells represent the main effects of exposure to roentgen rays and radium and probably explain the usually favorable action to these agents.

All the clinical circumstances indicate that inflammatory lesions respond to irradiation in proportion to the degree of leukocytic infiltration. In favor of this view are the experimentally proved radiosensitiveness of lymphocytes, polymorphonuclear leukocytes and eosinophils, the fact that the rate of regression of acute inflammations corresponds to the rate at which these cells are known to be destroyed by irradiation, and that these cells are the only cells commonly found in inflammatory lesions that could be affected at such a rapid rate by small or moderate doses. Other circumstances pointing in the same direction are that radiotherapy is most beneficial during the infiltrative stage and less beneficial during the suppurative stage and that, although the majority of lesions yield rapidly to treatment, some respond less rapidly or do not respond at all. Variation in the degree of leukocytic infiltration of different lesions of the same character or of similar lesions of different character is a well known pathologic fact. Therefore the degree of leukocytic infiltration must influence the action of the rays, because the rays can destroy leukocytes only in proportion to the number of these cells. This is undoubtedly related to and probably explains the fact that, while many inflammatory lesions are influenced favorably, some react much less or do not show any reaction.

When the inflammation is not confined to a small region but is extensive or diffuse rather than circumscribed, and when leukocytic infiltration is not a pronounced feature, as in erysipelas, the rays probably act in a somewhat different manner. Under these circumstances the smaller number of infiltrating leukocytes should prevent the rays from having the same local effect unless some compensatory mechanism enters into play. Evidence of such a mechanism in erysipelas has not yet been demonstrated, but that such a mechanism exists is indicated by the action of roentgen rays in other diseases. In bronchial asthma, for example, irradiation of the spleen or of other parts of the body remote from the bronchi and lungs is often followed by more or less striking relief from symptoms. What probably takes place is a destruction of leukocytes in the spleen and in the large mass of blood circulating through this organ. Then the cellular débris and the contents of the destroyed cells find their way into the general circulation, where they have been shown to produce a protein-like reaction. In inflammations that are not circumscribed and in which leukocytic infiltration is comparatively slight, the affected region is hyperemic and the vessels are more or less gorged with blood. Wide exposure of such a region to a small dose of rays undoubtedly causes many leukocytes to disintegrate, and the contents of the destroyed cells are liberated into the blood and throughout the tissue spaces. And the destruction of leukocytes is probably followed by changes similar to those described in connection with more limited inflammations. At least this would seem to be the most logical conclusion. Any other assumption would be inconsistent with the known facts and with the clinical behavior of this kind of inflammation.

Chronic Inflammations.—To understand the influence of irradiation on chronic inflammations it is necessary to bear in mind a few essential points. Depending on their character and on the etiologic factors which produce them, such lesions are characterized by varying degrees of leukocytic infiltration, connective tissue proliferation and caseous, calcareous or hyaline degeneration. Moreover, the clinical effect of irradiation is slow, and maximal improvement or cure requires repeated treatment at intervals. From what is known about the action of roentgen rays and radium on different varieties of cells and tissues, it seems most likely that these factors are closely related. Since they are products of cellular degeneration, caseous material and calcium deposited as the final stage of healing should not be influenced by irradiation, and this is precisely what is observed in practice. As we have already seen, the varieties of leukocytes which are such an important feature of inflammatory infiltration are exceptionally sensitive to roentgen rays or radium. Connective tissue cells, on the contrary, are comparatively resistant to irradiation; they are even less sensitive than the epithelium of the skin. In this respect the difference between lymphocytes or polymorphonuclear leukocytes and connective tissue cells is tremendous.

Analysis and correlation of these several factors would seem to furnish a satisfactory explanation of the effect of radiotherapy on chronic inflammatory processes. The greater the degree of leukocytic infiltration in proportion to connective tissue proliferation, the more marked and the more rapid is the influence of the treatment, and vice versa. If tuberculous lesions are taken as an example, it is well known that the effect of irradiation is greater during the infiltrative phase of the tubercles, when leukocytic infiltration is most pronounced, than it is when the leukocytic infiltration has diminished and has passed into an advanced stage of caseous degeneration or of repair by connective tissue or by calcification.

It is probable, therefore, that leukocytic infiltration, on the one hand, and connective tissue proliferation, on the other, act in opposite directions, the former tending to increase the effect of irradiation and the latter tending to diminish or retard this effect. This conclusion is in complete harmony with the experimental evidence and with all the clinical observations which have been recorded.

Council on Foods and Nutrition

ACCEPTED FOODS

THE FOLLOWING ADDITIONAL FOODS HAVE BEEN ACCEPTED AS CONFORMING TO THE RULES OF THE COUNCIL ON FOODS AND NUTRITION OF THE AMERICAN MEDICAL ASSOCIATION FOR ADMISSION TO ACCEPTED FOODS.

FRANKLIN C. BING, Secretary.

FATS AND OILS AND THEIR PRODUCTS (*See* Accepted Foods, 1939, p. 30).

Interstate Cotton Oil Refining Co., Sherman, Texas.

MRS. TUCKER'S SALAD OIL, refined cottonseed oil with a small amount (24 parts per million) of lecithin.

Analysis (submitted by manufacturer).—Specific gravity at 25 C. 0.9095, saponification value 190.8, iodine number 104.8, free fatty acids as oleic acid 0.03%, cold test (hours remaining brilliant at 0 C.) 8½ hours.

Calories.—9 per gram; 256 per ounce.

FOODS, FOR SPECIAL DIETETIC PURPOSES (*See* Accepted Foods, 1939, p. 295).

The Chicago Dietetic Supply House, Inc.

CELLU BRAND JUICE-PAK HAWAIIAN PINEAPPLE TIDBITS, without added sugar.

Analysis (submitted by manufacturer).—Moisture 83.7%, total solids 16.3%, ash 0.4%, fat (ether extract) trace, protein (N × 6.25) 0.4%, crude fiber 0.3%, carbohydrates other than crude fiber 15.2%.

Calories.—0.62 per gram; 18 per ounce.

CELLU BRAND JUICE-PAK SLICED YELLOW CLING PEACHES, without added sugar.

Analysis (submitted by manufacturer).—Moisture 90.1%, total solids 9.9%, ash 0.4%, fat (ether extract) 0.2%, protein (N × 6.25) 0.3%, crude fiber 0.3%, carbohydrates other than crude fiber (by difference) 8.7%.

Calories.—0.38 per gram; 11 per ounce.

FRUIT JUICES INCLUDING TOMATO JUICE (*See* Accepted Foods, 1939, p. 48).

Ladoga Canning Company, Indianapolis.

SUGAR LOAF BRAND TOMATO JUICE.

Analysis (submitted by manufacturer).—Moisture 94.0%, total solids 6.0%, ash 0.84%, sodium chloride (NaCl) 0.7%, water insoluble solids 0.48%, invert sugar 2.8%, carbohydrates (by difference) 4.5%, acidity 0.4%, acidity expressed as *p*H 4.33.

The firm reports that chemical titration (1937) showed that the canned tomato juice contained 17.2 mg. of ascorbic acid (344 international units of vitamin C) per 100 cc. Samples of raw tomatoes used in making the juice were found to contain 22.7 mg. (454 international units) of vitamin C per 100 cc.

Calories.—0.18 per gram; 5 per ounce.

The C. H. Musselman Company, Biglerville, Pa.

MUSSELMAN'S BRAND TOMATO JUICE.

Analysis (submitted by manufacturer).—Moisture 93.4%, total solids 6.6%, ash 1.0%, fat 0.1%, protein (N × 6.25) 1.0%, crude fiber 0.2%, carbohydrate other than crude fiber (by difference) 4.3%, reducing sugar as invert 3.2%.

The firm reports (1940) that chemical titration showed that the canned tomato juice contains from 18 to 23 mg. of ascorbic acid (from 372 to 454 international units of vitamin C) per 100 cc.

Calories.—0.20 per gram; 6 per ounce.

GRAIN PRODUCTS (*See* Accepted Foods, 1939, p. 95).

The Kansas Milling Company, Wichita, Kan.

SILK FLOSS BRAND CAKE FLOUR, white flour milled from soft winter wheat, bleached, heat treated.

Analysis (submitted by manufacturer).—Moisture 12.5%, total solids 87.5%, ash 0.3%, fat (ether extract) 1.0%, protein (N × 5.7) 8.0%, crude fiber 0.2%, carbohydrates other than crude fiber (by difference) 78.0%.

Calories.—3.5 per gram; 99 per ounce.

MILK AND MILK PRODUCTS OTHER THAN BUTTER (*See* Accepted Foods, 1939, p. 230).

Nowaygo Creamery Company, Nowaygo, Mich.

SPARTAN BRAND EVAPORATED MILK.

Analysis (submitted by manufacturer).—Moisture 74%, total solids 26%, ash 1.5%, fat (Roese-Gottlieb method) 7.9%, protein (N × 6.38) 7%, carbohydrates (by difference) 9.6%.

Calories.—1.38 per gram; 39 per ounce.

PREPARATIONS USED IN THE FEEDING OF INFANTS (*See* Accepted Foods, 1939, p. 156).

H. J. Heinz Company, Pittsburgh.

HEINZ BRAND CHOPPED MIXED VEGETABLES, a canned, cooked chopped mixture of white potatoes, carrots, sweet potatoes, celery, green beans, onions and sodium chloride.

Analysis (submitted by manufacturer).—Moisture 89.8%, total solids, 10.2%, ash 1.1%, fat (ether extract) 0.1%, protein (N × 6.25) 0.8%, crude fiber 0.5%, carbohydrates other than crude fiber (by difference) 7.7%, sucrose (Munson and Walker method) 2.7%, calcium (Ca) 0.030%, phosphorus (P) 0.026%, iron (Fe) 0.0054%, copper (Cu) 0.00004%.

According to report of biologic assay (1939) this product contains 1,700 international units of vitamin A, 9 international units of vitamin B_1 and 22 Sherman-Bourquin units of riboflavin per hundred grams. Report of chemical titration (1939) shows that the product contains 36 international units of vitamin C per hundred grams.

Calories.—0.35 per gram; 10 per ounce.

HEINZ BRAND CHOPPED SPINACH.

Analysis (submitted by manufacturer).—Moisture 94.5%, total solids 5.5%, ash 1.1%, fat (ether extract) 0.2%, protein (N × 6.25) 1.8%, crude fiber 0.7%, carbohydrates other than crude fiber (by difference) 1.7%, sucrose (Munson and Walker method) 0.4%, calcium (Ca) 0.174%, phosphorus (P) 0.035%, iron (Fe) 0.0023%, copper (Cu) 0.00008%.

According to report of biologic assay (1939) this product contains 4,500 international units of vitamin A, 11 international units of vitamin B_1 and 78 Sherman-Bourquin units of riboflavin per hundred grams. Report of chemical titration (1939) shows that the product contains 200 international units of vitamin C per hundred grams.

Calories.—0.16 per gram; 5 per ounce.

HEINZ BRAND CREAMED DICED POTATOES WITH ONIONS AND YEAST CONCENTRATE, a canned cooked mixture of white potatoes, milk, onions, cream (40% butterfat), flour, butter, sodium chloride and dried brewers' yeast.

Analysis (submitted by manufacturer).—Moisture 84.9%, total solids 15.1%, ash 1.3%, fat (ether extract) 2.5%, protein (N × 6.25) 1.7%, crude fiber 0.6%, carbohydrates other than crude fiber (by difference) 9.0%, sucrose (Munson and Walker method) 1.0%, calcium (Ca) 0.027%, phosphorus (P) 0.086%, iron (Fe) 0.00056%, copper (Cu) 0.00013%.

According to report of biologic assay (1939) this product contains 110 international units of vitamin A, 11 international units of vitamin B_1 and 37 Sherman-Bourquin units of riboflavin per hundred grams. Report of chemical titration (1939) shows that the product contains 62 international units of vitamin C per hundred grams.

Calories.—0.65 per gram; 18 per ounce.

HEINZ BRAND CREAMED GREEN VEGETABLES, a canned cooked mixture of milk, finely chopped green lettuce, peas, kale and asparagus, cream, flour and sodium chloride.

Analysis (submitted by manufacturer).—Moisture 87.2%, total solids 12.8%, ash 1.4%, fat (ether extract) 2.6%, protein (N × 6.25) 2.6%, crude fiber 0.9%, total carbohydrates other than crude fiber (by difference) 5.3%, sucrose (Munson and Walker Method) 2.1%, calcium (Ca) 0.060%, phosphorus (P) 0.050%, iron (Fe) 0.0046%, copper (Cu) 0.00023%.

According to report of biologic assay (1939) this product contains 845 international units of vitamin A, 17 international units of vitamin B_1 and 58 Sherman-Bourquin units of riboflavin per hundred grams. Report of chemical titration (1939) shows that the product contains 64 international units of vitamin C per hundred grams.

Calories.—0.55 per gram; 16 per ounce.

HEINZ BRAND CREAMED TOMATO AND RICE WITH VEGETABLES AND WHEY POWDER, a canned cooked mixture of tomatoes, carrots, white potatoes, cream, celery, sugar, rice, milk, whey powder, soya bean flour and sodium chloride.

Analysis (submitted by manufacturer).—Moisture 82.0%, total solids 18.0%, ash 1.7%, fat (ether extract) 2.2%, protein (N × 6.25) 2.1%, crude fiber 0.6%, carbohydrates other than crude fiber (by difference) 11.4%, sucrose (Munson and Walker Method) 7.2%, calcium (Ca) 0.032%, phosphorus (P) 0.044%, iron (Fe) 0.0017%, copper (Cu) 0.00066%.

According to report of biologic assay (1939) this product contains 1,480 international units of vitamin A, 20 international units of vitamin B_1 and 39 Sherman-Bourquin units of riboflavin per hundred grams. Report of chemical titration (1939) shows that the product contains 200 international units of vitamin C per hundred grams.

Calories.—0.74 per gram; 21 per ounce.

SUGARS AND SYRUPS (*See* Accepted Foods, 1939, p. 324).

Bliss Syrup & Preserving Co., Kansas City, Mo.

NECTAR BRAND CRYSTAL WHITE SYRUP, a mixture of corn syrup, cane sugar syrup, flavored with vanilla and a small amount of sodium chloride.

Analysis (submitted by manufacturer).—Moisture 24.5%, total solids 75.5%, ash 0.2%, reducing sugars as dextrose 30.0%, reducing sugars as dextrose after inversion with invertase 35.0%, sucrose (copper reduction method) 4.9%, dextrins (by difference) 40.4%.

Calories.—3.01 per gram; 85 per ounce.

Wood's Blanc Heat Company, Baltimore.

WOOD'S GOLDEN SYRUP, a mixture of corn syrup, refiners' syrup and sugar syrup.

Analysis (submitted by manufacturer).—Moisture 20.8%, total solids 79.2%, ash 0.7%, protein (N. × 6.25) 0.06%, reducing sugars as dextrose after inversion 38.2%, sucrose 2.4%, dextrins (by difference) 37.8%, specific gravity at 20 C. 1.4, specific gravity at 60 F. 40.4 degrees Baume.

Calories.—3.2 per gram; 91 per ounce.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

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SATURDAY, JANUARY 18, 1941

"VITAMIN SWEETS"

On January 9 the publicity agency for the British American Ambulance Corps released a mimeographed news statement to the American press stating that tablets to be known as "Vitamin Sweets" were being prepared in great quantities for shipment to England. According to information just obtained, the tablets of "Vitamin Sweets" were to contain vitamin A 7,000 international units,[1] vitamin B, 700 international units, riboflavin 4.6 mg., ascorbic acid 70 mg., vitamin D 700 international units, and sucrose with flavoring 21 Gm., this amount to make one roll of fourteen tablets. The children of Great Britain, it was suggested, would receive six tablets daily. According to the newspaper release, these are all the vitamins necessary to prevent deficiency disease. It was stated that "an adequate supply of these vitamins will prevent such symptoms as moodiness, sluggishness, fear, mental and physical fatigue as well as the ordinary deficiency diseases such as rickets, scurvy, beriberi, pellagra, cheilosis (sores around the mouth) and 'blackout blindness.'" Such claims are of course preposterous and far exceed those permitted by any recognized group having to do with vitamins, including the Council on Pharmacy and Chemistry and the Council on Foods and Nutrition. Such publicity undoes much of the work of the Food and Drug Administration and of the Federal Trade Commission, which have been trying to keep claims for commercial vitamin preparations within reason. "For $8.55, 156 rolls of 'Vitamin Sweets' sufficient for one child for a year may be purchased in this country for shipment to Britain," according to a representative of the British American Ambulance Corps. Apparently some sincere, well intentioned physicians approached the British Ministry of Health about the possibility that American friends of the British could supply sugar tablets containing vitamins. Sugar was rationed, the British people liked sugar, and vitamins, it was thought, would be more acceptable in this form. The Ministry of Health stated it was grateful for the offer. In the meantime, six American authorities in the field of nutrition consented to serve on the committee and to consider the plan; hence the publicity referring to the panel of six well known physicians who had collaborated in devising a new formula with the advice and cooperation of the British minister of health. Unfortunately, according to available information, most of these physicians had not endorsed or been informed of the contents of the publicity sent out by the agency of the British American Ambulance Corps.

In the release it was stated that "a committee called 'Vitamins for Britain' obtained the services of Dr. Philip Newton, an expert in the pharmacologic blending of several vitamins, who worked out for us a method by which vitamins A, B_1, B_2, C and D could all be incorporated in a flavored candy stick." Concerning the identity of Dr. Newton, a telegraphic inquiry was sent to the British American Ambulance Corps. The reply verified that he is apparently the same Philip Newton who was described in THE JOURNAL Nov. 12. 1927 as the promoter of Matamel, a nostrum which had been puffed as a cure for Bright's disease, bladder trouble and hypertrophy of the prostate. In 1926 he signed an agreement with the Post Office authorities, stipulating that the mail order business operated by the Newton Laboratories would be discontinued and abandoned. Previously, the New York papers in August 1924 had reported that Newton had been arraigned in the court of the city of New York on charges of violating a penal law which prohibits placing in newspapers advertisements relating to certain diseases.

The Council on Foods and Nutrition has not adopted the proposal that vitamins be incorporated in "sweets" as far as the American market is concerned. The plan proposed cannot be considered other than an experiment. The unwise propaganda might well lead to commercialism in this country of synthetic vitamins in so-called vitamin candy. Sufficient evidence of what might be the effect of vitamin D in diets low in calcium and phosphorus is not available. Likely the children may suffer from lack of food in general. The vitamin mixture is certainly not complete; it does not provide all the vitamins necessary to prevent deficiency diseases. As far as THE JOURNAL is aware there is no practical evidence of the stability of these tablets. There should be no implications that, by supplying vitamins alone, health may be maintained.

In times of war, hysterical overenthusiasm should not influence the scientific thought of authorities. Publicity arising in this country dealing with problems of health in belligerent countries must consider the effect of such publicity on American citizens in the light of American ideals and standards.

1. The vitamin A is probably an ester from fish liver oil concentrate. The Eastman Kodak Company has been working on such a preparation.

UNIONIZATION OF HOSPITAL EMPLOYEES

Efforts on the part of unions in Pennsylvania to unionize hospital employees were recently surveyed critically in connection with a case decided by the Supreme Court of Pennsylvania on January 6.[1] Apparently, attempts to form a union among hospital employees were opposed by the officials of some twenty-five hospitals involved. The hospitals refused to execute a proposed agreement with the unions or to negotiate any agreement, and the unions then appealed to the Pennsylvania Labor Relations Board, charging unfair labor practices on the part of the hospitals. The matter came before the court of common pleas of Dauphin County when the hospitals filed a bill for an injunction to restrain the Labor Relations Board and the unions from proceeding with the plans under consideration. This petition stated that the formation of a union among hospital employees would result in demands of such a character as to jeopardize the financial ability of the hospitals to function and that efforts to enforce these demands by strikes or otherwise would seriously imperil the management of the hospitals and the lives, health and safety of the patients. It was pointed out that the demands already made would entail an increased yearly outlay of more than $2,000,000 and would, if granted, in effect transfer control of the hospitals from their officials to the unions. The lower court granted the preliminary injunction, giving the relief sought, and the defendants appealed to the Supreme Court of Pennsylvania, which in a per curiam decision affirmed the decree of the court below.

The first question disposed of in this case was whether the State Labor Anti-Injunction Act prevented the court from issuing the injunction sought by the hospitals. That act applies to situations involving or growing out of "a labor dispute when the case involves persons who are engaged in a single industry, trade, craft, or occupation." In holding that this act had no application to the facts involved in the case before it, the court asserted that a hospital is not an industry nor are the employees of a hospital engaged in a single trade, craft or occupation. Student nurses, the court pointed out, interns, doctors, surgeons, clerks, stenographers, bookkeepers, elevator operators, ambulance drivers, laundresses, mechanics, technicians, charwomen and others may be employed by a hospital and they may have a common employer but they have no single trade, craft or occupation. Giving the words "industry, trade, craft, or occupation" their commonly accepted meaning, the court did not feel that they include the operations of a hospital. "Even though the words of the statute be interpreted as broad enough to include the operations of a hospital," the court continued, "we do not think that the legislature intended such a result. The purpose of the Act is to preserve the status quo during labor disputes, to insure the right to bargain collectively, and to give to employees the right to choose representatives for this purpose. To show the scope of the Act, the Legislature attempted to define cases which 'involve or grow out of a labor dispute.' In doing so, it used the words 'industry, trade, craft or occupation.' It has not been the custom in the past to unionize hospitals. The effect of unionization and attendant efforts to enforce demands would involve results far more sweeping and drastic than mere property rights. The question of profit for the employer or wages for the employee are not alone involved. It is not merely a matter of suspending operations, ceasing work and stopping production, such as might be true in a steel mill or automobile factory. It is a question of protecting the health, safety and, in many cases, the very lives of those persons who need the service a hospital is organized to render. The results are quite different and more extensive than are involved in an ordinary labor dispute. We cannot conceive that the Legislature intended to include hospitals within the purview of the Act. Consequently, even though the words used might conceivably be broad enough to include a hospital, nevertheless, a hospital is not within the spirit of the Act, and not being within the spirit, the Act does not apply to it."

Another question before the court was whether the Pennsylvania Labor Relations Act, designed to protect the right of employees to organize and bargain collectively, had any application. "Hospitals are scientific institutions," the court said, "created for a humane purpose in amelioration of the sufferings of mankind. They require for their successful operation highly skilled physicians, surgeons, technicians, experts and nurses. They likewise require the services of other persons, some of whom may be skilled and some unskilled. But the whole must be coordinated, controlled and uninterrupted to accomplish the general purpose. This would be impossible, should we hold the Labor Act applicable with all its attending ramifications, interruptions and possible cessation of service due to labor disputes and attending financial inability to function. Surely the Legislature had no such intention and we cannot so find in the absence of a clear and positive declaration to that effect."

In addition, the court pointed to the fact that the term "employer" as defined by the Labor Relations Act excludes the commonwealth or any political subdivision thereof. While the hospitals involved in this case are not political subdivisions, the court said, they are, with few exceptions, agencies selected by the commonwealth as a means of assisting in some degree the indigent sick, disabled, injured or afflicted. "Should the state choose to operate general hospitals," the court pointed out, "as it does certain mental hospitals, no

1. The Western Pennsylvania Hospitals, et al. v. Levi G. Lichliter, Harry Gifford, and William L. Dickel, constituting the Pennsylvania Labor Relations Board, et al., and Hospital Workers Local Union No. 255 of the State, County and Municipal Workers of America, Affiliated with the Congress of Industrial Organizations, et al.

one would claim that it was not performing a function of government and in so doing is not an employer within the meaning of the Act. Since the State chooses to perform this function through agencies, supported in part by State appropriations, these agencies are likewise beyond the scope of the Act. Were this not so, the appropriations might be diverted from their intended purpose to aid the indigent sick, and injured to the payment of wages and increased operating costs." To the court it was obvious and indisputable that the hospitals involved in the case were impressed with a public interest which removed them from the purview of the Labor Relations Act. The opinion of Judge Richards in this case, which the Supreme Court characterized as "comprehensive," constitutes an important contribution to judicial literature and evidences a thorough understanding of the extremely important part played by hospitals in preserving the "health, safety and, in many cases, the very lives" of the people.

CALIFORNIA GOVERNOR ADVOCATES UNIVERSAL COMPULSORY HEALTH INSURANCE

Governor Olson of California in his message to the California legislature on January 6 made a specific recommendation that "California adopt a system of universal compulsory health insurance." The governor said:

> The need and demand for such insurance is amply demonstrated by the many plans proposed or already in operation, including that advanced by the medical association. These plans are all constructive in purpose and many of them are quite useful within their limits but, by their very nature, they cannot meet the broad needs of society.
>
> There is but one method that is socially adequate. That is the method already applied to workmen's compensation insurance, old age insurance and unemployment insurance. It is the method applied to health insurance in twenty-four of the twenty-seven countries having health insurance; that is, by making it both universal and compulsory. In our Department of Employment, which administers unemployment insurance in California, we already have the machinery and the organization to take over the work of administering a health insurance plan.

One can only conjecture as to the type of health insurance the governor would foist on the state. From the generality of the language in the meager reference, Governor Olson seems to be recommending something far beyond anything that the most vociferous health insurance fanatics have advocated. Even the so-called Epstein bill, drafted in 1934 for the American Association for Social Security and introduced in many state legislatures annually since that date, has not proposed universal coverage but provides exemptions with respect to income and employments. Governor Olson would apparently administer the nebulous scheme he proposes through a state department of employment. From such an administrative agency one could hardly anticipate any understanding of the medical needs of the population, any appreciation of available medical facilities or any intelligible comprehension of the innumerable problems that are essentially medical.

A proposal as far reaching as that of Governor Olson should be based on careful and adequate study of the factors involved; this proposal has not been based on any such study. True the California Medical Association conducted in the early thirties a statewide study of the medical needs and facilities of the state and expended well over $50,000 of its own funds on the project. The state medical association cooperated with a state senate interim committee in a survey of the situation. After the house of delegates of the state association in a special session held late in 1934 by a close vote apparently endorsed the principle of compulsory health insurance, the interim committee and representatives of the state association jointly drafted a health insurance bill, which was introduced in the legislature in 1935. The measure was favorably reported out of committee but made no further legislative progress. That measure, however, is distantly, if at all, related to the system suggested by Governor Olson.

The California Medical Association has continued its efforts to procure an adequate solution to the medical problems of the lower and middle income group of the state. Quite properly it has felt its way slowly. After thoughtful evaluation of the situation a prepayment medical service plan limited somewhat as to services and available to the lower and middle income group has been put in operation. As experience and sound actuarial practices indicate and permit, it is proposed to widen the scope and availability of the plan. What the state association has done, it is believed, is sound and workable. If given the chance, the association's plan should fulfil the needs both of the public and of the medical profession. All of this obviously would be for naught and would be scrapped were any such actuarially unsound and socially undesirable measures as that urged by the governor to eventuate into law.

Current Comment

A DEFICIENCY DISEASE IN FOXES

A disease common on fox ranches called "Chastek paralysis" is a well defined syndrome characterized by a preliminary period of anorexia followed by the rapid development of weakness, ataxia and spastic paralysis. The outbreaks of this disease have for the most part occurred between November and May and invariably are on fox ranches where fish or fish products are fed as 10 per cent or more of the diet. This disease attains importance for man in its close clinical and pathologic resemblance to Wernicke's polioencephalitis. This type of polioencephalitis has been shown by Alexander to be due to a deficiency of vitamin B_1 in the presence of an adequate supply of other vitamins. The observations of Green and Evans [1] on Chastek paralysis make it clear that the disease in foxes is brought about by their eating fish and that the consumption of fish somehow

1. Green, R. G., and Evans, C. A.: A Deficiency Disease of Foxes, Science 92: 154 (Aug. 16) 1940.

produces a B_1 avitaminosis in these animals. The mechanism by which it is brought about is not known. It has been suggested that some substance or substances in whole fresh fish and in alcoholic liquors are specifically destructive to vitamin B_1 in these similar conditions in the fox and in man.

INTERNS, RESIDENTS AND THE RESERVE CORPS

On December 19 the Adjutant General of the United States Army issued to all corps area and department commanders the following instructions:

1. The Surgeon General and Corps Area and Department Commanders are authorized to recommend for appointment sufficient applicants to fill any vacancies existing or occurring under the approved peacetime procurement objective for Reserve Officers in the Medical Department Reserve.

2. All appointments under this authority will be made in the lowest grade in the section in which commission is sought, and appointments will be limited to those who meet the requirements of AR 140-5 and AR 140-33.

3. Each application must be accompanied by a written statement by the applicant that he does not come within the category of those entitled to resign under the provisions of section 3 (c), Public Resolution 96, 76th Congress, or that he will not exercise such rights if ordered to active duty.

4. Current War Department instructions governing appointments in "affiliated" medical units continue unchanged.

The intent of these instructions is to enable the Surgeon General of the Army to commission in the Medical Reserve Corps young men who now hold positions as interns or residents or, indeed, any other medical positions of importance, and then to determine by suitable study whether or not their call to active service may be deferred until the completion of their internship or residency, or until their service is needed. The significant instruction is that under which the applicant agrees that he will not come within the category of those entitled to resign, and that he will not exercise the right to resign if ordered to active duty.

THE HUMAN MECHANISM AND THE SUBMARINE

Because the submarine, especially under conditions of warfare, imposes certain environmental conditions not inherent on surface ships, medical problems of a particularly difficult nature develop in the care of the personnel. Recently Brown [1] has reviewed some of the problems faced by the medical officers responsible for the care of men on this exacting duty. First the selection of men must be especially rigid and the criteria must include strong eyes, keen hearing and the ability to equalize air pressure of 50 pounds to the square inch on the ear drum, since this quality is essential in escape training with the submarine "lung." Nervous stability is important, as a special nervous strain results from this type of work. Much study has been devoted to the vitiation of air which follows from respiration during submergence. The upper permissible limit for carbon dioxide is 3 per cent and the lower limit for oxygen 17 per cent, both of these including a margin of safety. Lethal or toxic gases have caused serious accidents: If sea water gains access to the storage batteries, sodium chloride will be electrolized and chlorine evolved in dangerous volume. Another highly toxic gas which has led to poisoning is arsine, or arseniuretted hydrogen. Methyl chloride has also been known to produce dangerous poisoning in submarines. Besides gases, high temperatures and high humidities, especially under certain circumstances, produce serious problems during submerged operation. Numerous safety devices have been developed to counteract such hazards, including an analyzer to determine the concentration of carbon dioxide in the air and most notably the escape appliance better known as the submarine "lung" and designed for individual escape from the submarine. Finally, the special strain which submarine duty imposes on the personnel requires suitable facilities at the home base for comfort, relaxation and frequent leave periods.

1. Brown, Capt. E. W.: The Human Mechanism and the Submarine, U. S. Naval Institute Proceedings 66:1608 (Nov.) 1940.

IMMUNIZATION AGAINST INFECTIOUS DISEASES IN THE ARMY

Efficiency among troops is dependent on good health. Among important health measures, as pointed out by Simmons,[1] are those prophylactic immunizations which can be carried out for infectious diseases. Three of them are applicable to all military personnel: smallpox, typhoid and paratyphoid, and tetanus. The effectiveness of vaccination against smallpox is so generally accepted as to make discussion unnecessary. Antityphoid vaccination has also been shown to be effective both for military personnel in time of war and for civil populations. However, the triple typhoid vaccine was discontinued after the last war and replaced first by the typhoid-paratyphoid A vaccine and later by a monovalent vaccine. Because of the present emergency and possible exposure to paratyphoid fevers, a triple typhoid vaccine has been readopted. The use of tetanus toxoid as a prophylactic has developed since the last war; it is now employed by practically all armies and has proved its usefulness. The initial vaccination with the toxoid as adopted by the army will consist of three 1 cc. doses given three weeks apart. This will be followed by subsequent doses of 1 cc. each given at the end of one year, at the time of departure for a theater of operations, if this occurs more than six months after the last dose received, or whenever the individual is wounded or otherwise exposed to infection with tetanus. In addition to these prophylactic agents there are methods of immunization available against localized outbreaks of disease endemic in this country such as diphtheria or scarlet fever. Some of the more serious diseases to which men in the continental United States would not ordinarily be exposed are subject to prophylactic inoculations of various degrees of established value including yellow fever, cholera, plague and typhus. Prophylactic inoculations against such infections as gas gangrene, malaria, relapsing fever, Oroya fever, the venereal infections, measles, mumps, meningitis, poliomyelitis and encephalitis constitute a further challenge. Experiments of an encouraging nature using pneumococcus polysaccharide solution for immunization against pneumonia have already taken place.

1. Simmons, J. S.: Immunization Against Infectious Diseases in the United States Army, South. M. J. 34:62 (Jan.) 1941.

MEDICAL PREPAREDNESS

In this section of The Journal each week will appear official notices by the Committee on Medical Preparedness of the American Medical Association, announcements by the Surgeon Generals of the Army, Navy and Public Health Service, and other governmental agencies dealing with medical preparedness, and such other information and announcements as will be useful to the medical profession.

CALL FOR ARMY NURSES

The superintendent of the Army Nurses Corps, Major Julia O. Flikke, Surgeon General's Office, Washington, D. C., gave an urgent call January 2 for three thousand five hundred immediate volunteer nurses to serve in army hospitals in military training camps, mostly in the southern part of the country. However, about 684 of them can be used in the Third Corps Area (Pennsylvania, Virginia, Maryland and the District of Columbia). The recruiting agent for the Army Nurses Corps is the American Red Cross, and although seventeen thousand qualified nurses are on the reserve list they have been accepting assignment to active duty slowly and perhaps as the result of their failure to realize, it was said, that the need is really acute.

BARRACKS FOR WALTER REED HOSPITAL

Two barracks will be constructed to house reserve officers who will pursue special courses at Walter Reed General Hospital at the Army Medical Center in Washington from time to time in surgery and in other medical practice, each barrack to have a capacity of forty officers. A total of seventeen barracks will be built to house enlisted personnel ordered to Walter Reed for technical training as laboratory, roentgen ray and dental technicians, ward masters and ward nurses, and in other capacities. A mess hall and kitchen to accommodate seven hundred and fifty enlisted men will be constructed as part of a $584,056 program authorized by the War Department on December 16.

EQUIPMENT FOR PREVENTION OF ASPHYXIAL DEATH

The Society for the Prevention of Asphyxial Death, New York, has received notice from the British Red Cross Society in London that the equipment exhibited by the society at the New York World's Fair has been safely received. This society recently appealed for funds amounting to about $4,000 to send this asphyxia prevention equipment to England.

The society has had designed also a special resuscitation unit for the treatment of the three stages of asphyxia (depression, spasticity and flaccidity) and had it assembled for oversea service. Each unit will cost $150. The Society for the Prevention of Asphyxial Death is now making an appeal for funds to secure one thousand of these resuscitation outfits to prevent death from asphyxial accidents which occur as the result of air raids. Each outfit sent abroad will bear the name of the donor, be this an individual, a club, a hospital staff, a nurses' training school or a college or fraternity group. Those desiring to participate in thus extending relief for emergencies now occurring in Britain should communicate at once with the Society for the Prevention of Asphyxial Death, 38 East Sixty-First Street, New York; telephone Regent 4-3515.

CLASSES AT CARLISLE BARRACKS

The class of one hundred and seventy officers now at the Medical Field Service School at Carlisle Barracks, Pa., began its course Dec. 9, 1940 and finished January 11. Immediately thereafter another class of about two hundred officers started. The normal courses of several months have been suspended on account of the emergency, and in their place the school has short courses, averaging one month each, for newly commissioned reserve officers who have been ordered to active duty. The instruction covers only important subjects that are not taught in medical, dental or veterinary schools—map reading, military art, logistics (the science of transporting men and supplies), medical department administration, methods of training (officers and enlisted men), field sanitation, military preventive medicine, tactics and military law.

CONFERENCE OF PSYCHIATRISTS

A conference of psychiatrists from various states was held in Washington, D. C., January 2-3. Clarence A. Dykstra, director of Selective Service, and Brig. Gen. Lewis B. Hershey, deputy director of Selective Service, presided at the first two sessions. Paul V. McNutt, Federal Security Administrator, spoke on "What We Expect of Psychiatry in the National Defense Program." Dr. James S. Plant, director of the Essex County (N. J.) Juvenile Clinic, discussed "The Psychiatric Challenge in Selective Service." Other speakers were Lewellys Barker, formerly chief of the medical service at Johns Hopkins University Hospital, Baltimore; Dr. Harry S. Sullivan of the William Alanson White Psychiatric Foundation; Drs. Winfred Overholzer, Roscoe W. Hall and Alexander Simon of St. Elizabeth's Hospital, Washington, D. C.; Dr. Lauren Smith of the Pennsylvania Institute; Dr. Spafford Ackerley of the University of Louisville School of Medicine, Louisville, Ky.; Dr. Dexter M. Bullard of Chestnut Lodge Sanitarium; Dr. Martin Cooley of the Veterans' Administration, and Lieut. Col. William C. Porter, M. C., U. S. Army. Guests at the conference included local draft board physicians from Virginia, Maryland, West Virginia, North Carolina, Delaware and Washington, D. C. According to the Washington *Star*, Col. Leonard G. Rowntree, newly appointed medical director of Selective Service, said that the general purpose of the conference was to create standards on a national basis for choosing the best type of man for military training. This is the first conference of a nationwide series to be held in different parts of the country.

ARMY RESERVE OFFICERS ORDERED TO ACTIVE DUTY

THIRD CORPS AREA

The following additional medical reserve corps officers had been ordered to extended active duty by the Commanding General, Third Corps Area, up to January 3. The Third Corps Area comprises the states of Pennsylvania, Virginia, District of Columbia and Maryland.

ARNAO, James, 1st Lieut., Philadelphia, Camp Shelby, Miss.
BANEN, David Merton, Captain, Baltimore, Camp Blanding, Fla.
BARKOFF, Samuel, 1st Lieut., Sykesville, Md., Fort George G. Meade, Md.
BECKER, Philip Lawrence, 1st Lieut., Pittsburgh, Fort George G. Meade, Md.
BERGER, Emanuel, 1st Lieut., Pittsburgh, Camp Shelby, Miss.
BLOOM, Charles Henry, Captain, Altoona, Pa., Altoona Induction Board, Altoona, Pa.
BOUCEK, Charles Michael, Captain, Pittsburgh, Fort Knox, Ky.
BOUCEK, Richard John, 1st Lieut., Pittsburgh, Camp Blanding, Fla.
BRIGULIO, Alfred Emanuel, 1st Lieut., Washington, D. C., Fort George G. Meade, Md.
BUTLER, William Sullivan, 1st Lieut., Wellsboro, Pa., Fort Eustis, Va.
CADY, Joseph Bishop, 1st Lieut., Sayre, Pa., Indiantown Gap, Pa.
CAMERON, Donald Young, Captain, Mount Lebanon, Pa., Fort Monroe, Va.
CAMPBELL, Otho Perry, 1st Lieut., White Stone, Va., Camp Blanding, Fla.
CARBONETTA, Reno Raymond, 1st Lieut., Lancaster, Pa., Camp Lee, Va.
CARLSON, Winfield Bankerd, Jr., Captain, Pittsburgh, Camp Blanding, Fla.
CHASE, William David, 1st Lieut., McLean, Va., Fort Eustis, Va.
CHRISTMAN, Albert Henry, 1st Lieut., Emporium, Pa., Fort Eustis, Va.
CLEAVER, Edgar Eugene, 1st Lieut., Palm, Pa., Camp Blanding, Fla.
COHEN, Franklin Harry, 1st Lieut., Norfolk, Va., Camp Shelby, Miss.
COHEN, Morris M., 1st Lieut., Pittsburgh, Fort Monroe, Va.
CORRIGAN, Timothy Michael, 1st Lieut., Hazelton, Pa., Camp Blanding, Fla.
CULLEN, Baker William, 1st Lieut., State College, Pa., Camp Shelby, Miss.
DAVIS, Jacob Ralph, 1st Lieut., Pittsburgh, Camp Blanding, Fla.
DOUGHERTY, Francis Michael, 1st Lieut., Summit Hill, Pa., Camp Blanding, Fla.
EDWARDS, Hugh Robertson, 1st Lieut., Newport News, Va., Camp Shelby, Miss.
EISNER, Albert L., Captain, Monaca, Pa., Camp Pendleton, Va.
ELLIOTT, Grant Roosevelt, Captain, Orange, Va., Camp Blanding, Fla.
ENSMINGER, Chalmers Da Costa, Captain, York, Pa., Fort George G. Meade, Md.
FAUDREE, Leslie Allen, 1st Lieut., Stanleytown, Va., Camp Blanding, Fla.
FEAR, Jesse Gerard, 1st Lieut., Berwick, Pa., Camp Shelby, Miss.
FITZGERALD, Edward Murray, 1st Lieut., Pittsburgh, Camp Blanding, Fla.
FOSTER, Frederic James, 1st Lieut., Washington, D. C., Fort Benning, Ga.
FRIEDMAN, Joseph, 1st Lieut., Westernport, Md., Fort George G. Meade, Md.
FRIEND, Arthur, 1st Lieut., Dupont, Pa., Camp Blanding, Fla.
FRONCZEK, William Michael, 1st Lieut., Pittsburgh, Camp Blanding, Fla.
GABRESKI, Thaddeus Stanley, 1st Lieut., Oil City, Pa., Camp Shelby, Miss.
GOLDSTEIN, Ralph Leon, 1st Lieut., Renovo, Pa., Camp Shelby, Miss.
GUENON, William Augustus, 1st Lieut., Greencastle, Pa., Camp Blanding, Fla.
GRASS, Edward Jacob, Captain, Washington, D. C., Camp Shelby, Miss.
HALL, Gordon Douglas, 1st Lieut., Dumbarton, Va., Camp Blanding, Fla.
HAMMOND, Charles Pries, 1st Lieut., Lancaster, Pa., Camp Shelby, Miss.
HARTWELL, Donald Clifford, 1st Lieut., Takoma Park, D. C., Camp Blanding, Fla.
HAZLETT, Frank Dickerson, Captain, Waynesburg, Pa., Camp Shelby, Miss.
HELLMAN, Leo Alfred, Captain, Port Alleghany, Pa., Camp Shelby, Miss.
HELWIG, Frederick George, 1st Lieut., Allentown, Pa., Camp Blanding, Fla.
HELZLSOUER, Wilbert James, 1st Lieut., Dravosburg, Pa., Camp Shelby, Miss.
HESSION, Henry Monroe, 1st Lieut., Philadelphia, Camp Blanding, Fla.
HOCKENBERRY, Ralph Emerson, 1st Lieut., Smethport, Pa., Camp Blanding, Fla.
HOPEWELL, Edward Lee, 1st Lieut., Strasburg, Va., Camp Shelby, Miss.
HULL, Logan Ben, 1st Lieut., Altoona, Pa., Camp Blanding, Fla.
ITSCOITZ, Seymour E., 1st Lieut., McKeesport, Pa., Camp Shelby, Miss.
JACOBSON, Philip, 1st Lieut., Williamsport, Pa., Camp Shelby, Miss.
KELLY, Thomas Joseph, 1st Lieut., Washington, D. C., Camp Blanding, Fla.
LARGE, John Simpson, 1st Lieut., Somerset, Pa., Camp Blanding, Fla.
MAHONEY, Vincent Paul, 1st Lieut., Connellsville, Pa., Fort Eustis, Va.
MARKLE, Cyrus Painter, Jr., 1st Lieut., West Newton, Pa., Fort Eustis, Va.
MATTHER, Clayton Black, Captain, Drexel Hill, Pa., Fort George G. Meade, Md.
MORSE, Edward Clarke, Major, Washington, D. C., Fort Eustis, Va.
NAEGELI, Frank Delee, Jr., 1st Lieut., Philadelphia, Fort Eustis, Va.
NOBLE, Nathan Morton, 1st Lieut., Philadelphia, Camp Pendleton, Va.
PETER, Arnold Leo, 1st Lieut., Baltimore, Fort George G. Meade, Md.
PLACE, Elmer Raymond, Captain, Skippack, Pa., Fort Eustis, Va.
RIGGLE, Paul Phillips, Captain, Washington, Pa., Fort Myer, Va.
RITTENHOUSE, Emory Arthur, 1st Lieut., Monongahela, Pa., Fort Myer, Va.
ROGEL, Louis Frederick, 1st Lieut., Uniontown, Pa., Fort Monroe, Va.
SAPIRA, Harry Albert, Captain, Elizabeth, Pa., Fort Monroe, Va.
SEDWICK, Jack Donovon, 1st Lieut., Brockway, Pa., Fort Monroe, Va.
SHAPIRO, Jerome Joseph, 1st Lieut., Richmond, Va., Camp Pendleton, Va.
SIEGEL, Bernard, 1st Lieut., Philadelphia, Camp Pendleton, Va.
SIMPSON, Allan James, Jr., 1st Lieut., McKeesport, Pa., Camp Shelby, Miss.
SPECTOR, Martin, 1st Lieut., Philadelphia, Fort Jackson, S. C.
SWISS, Adam George, 1st Lieut., Baltimore, General Dispensary U. S. Army, Baltimore.
THOMPSON, Thomas Ewing, Jr., 1st Lieut., Avalon, Pa., Fort Belvoir, Va.
WOOLHANDLER, Harry William, Captain, Erie, Pa., Fort Belvoir, Va.

FOURTH CORPS AREA

The following medical reserve corps officers have been ordered to active duty by the Commanding General, Fourth Corps Area, since Dec. 27, 1940. The Fourth Corps Area comprises the states of Tennessee, North Carolina, South Carolina, Alabama, Georgia, Mississippi, Florida and Louisiana.

ADAMS, Daniel M., 1st Lieut., Panama City, Fla.
BERMAN, Dave, 1st Lieut., Columbus, Ga., Camp Blanding, Fla.
BOWIE, Eleazar R., Lieut. Col., New Orleans, Fort Benning, Ga.
BROOK, Clarence L., 1st Lieut., Tuscaloosa, Ala., Camp Blanding, Fla.
CAMP, Horton, 1st Lieut., Pittsboro, N. C.
COLEMAN, Olon H., 1st Lieut., Jacksboro, Tenn., Camp Blanding, Fla.
DAFFIN, Charles H., 1st Lieut., Jacksonville, Fla.
DEAL, Albert M., 1st Lieut., Statesboro, Ga.
DePRIEST, Frederick E., 1st Lieut., Batesville, Miss.
DeRAMUS, William H., 1st Lieut., Selma, Ala.
DIDCOCT, John W., 1st Lieut., Paris, Tenn.
GIBSON, Rae B., 1st Lieut., Greeneville, Tenn., Fort Jackson, S. C.
HENDRIX, Clive V., Captain, Oneonta, Ala.
HERRON, Henry H., 1st Lieut., Bemis, Tenn., Camp Peay, Tenn.
KAUFMAN, James K., 1st Lieut., Nashville, Tenn., Camp Peay, Tenn.
KENDALL, John H., 1st Lieut., Richlands, N. C.
KERAMIDAS, Theodore C., 1st Lieut., Winter Haven, Fla.
KILLEFFER, John J., 1st Lieut., Chattanooga, Tenn.
LAIRD, Earl L., 1st Lieut., Union, Miss., Fort McClellan, Ala.
LYTLE, Carl S., 1st Lieut., Ocala, Fla.
McGRAW, Felix J., 1st Lieut., Birmingham, Ala.
McKELL, Thomas E., 1st Lieut., West Point, Miss., Camp Peay, Tenn.
McKEY, Earle S., Jr., 1st Lieut., Valdosta, Ga.
MILTON, John D., Captain, Miami, Fla.
MULLINS, Julius H., 1st Lieut., Baton Rouge, La.
NORMENT, Robert L., 1st Lieut., Fayetteville, N. C.
OCHS, Louis, Jr., 1st Lieut., New Orleans, Fort Benning, Ga.
PARKER, Paul H., 1st Lieut., Margaret, Ala., Camp Shelby, Miss.
PARKS, Harry, 1st Lieut., Atlanta, Ga., Camp Stewart, Ga.
PLUMMER, David E., 1st Lieut., Durham, N. C.
PRICE, George W., Jr., 1st Lieut., Spartanburg, S. C., Camp Blanding, Fla.
RICHARDSON, Guy C., Captain, Bristol, Tenn., Fort McClellan, Ala.
RIZZO, Frank P., Major, Monroe, La.
ROGERS, Hunter B., Captain, Miami, Fla., Camp Shelby, Miss.
ROSENFELD, Abraham P., 1st Lieut., Dillon, S. C.
RUFFIN, James S., Jr., 1st Lieut., Knoxville, Tenn., Camp Peay, Tenn.
RUSSEL, John C., Jr., 1st Lieut., Cleveland, Miss., Camp Shelby, Miss.
SADOVE, Max G., 1st Lieut., Savannah, Ga., Camp Blanding, Fla.
SALLE, George F., 1st Lieut., Vanceboro, N. C., Carlisle Barracks, Pa., 1 month, then to Camp Lee, Va.
SANDERS, Keith F., 1st Lieut., Kingstree, S. C., Camp Shelby, Miss.
SAWYER, James L., 1st Lieut., Folkston, Ga.
SHAW, Vaughan A., 1st Lieut., Daytona Beach, Fla.
SHIPP, Larry G., 1st Lieut., Anniston, Ala., Camp Blanding, Fla.
TEMPLES, Andrew K., 1st Lieut., Augusta, Ga.
TEMPLETON, Clinton M., 1st Lieut., Augusta, Ga., Camp Shelby, Miss.
WARRICK, George W., 1st Lieut., Birmingham, Ala.
WARRINER, Richard B., 1st Lieut., Corinth, Miss.
WILSON, George D., 1st Lieut., Kernersville, N. C., Camp Shelby, Miss.
WORTH, Thomas C., 1st Lieut., Raleigh, N. C.
WRIGHT, James C., Captain, Chattanooga, Tenn.
YOUNG, Henry D., 1st Lieut., Bushnell, Fla.
YOUNG, Joseph A., 1st Lieut., Newton, N. C.

Relieved from Duty

The following officers previously reported have been relieved from duty or their orders have been revoked:

BROOKS, Marshall, Jr., 1st Lieut., Atlanta, Texas.
COLLINS, Braswell E., 1st Lieut., Waycross, Ga.
FARRAR, Turley, 1st Lieut., Memphis, Tenn.
GORDON, Joseph T., 1st Lieut., Pulaski, Tenn.
HYER, Yeadon M., 1st Lieut., Darlington, S. C.
KENDALL, Cyrus E., 1st Lieut., Madison College, Tenn.
PARKER, Shepard, 1st Lieut., Shelby, N. C.
SMITH, Daniel L., Jr., 1st Lieut., Spartanburg, S. C.
STATON, Leon R., 1st Lieut., Hayesville, N. C.

CORRECTION

Lieut. Alexander F. Russell.—In the Medical Preparedness section of THE JOURNAL, Dec. 28, 1940, page 2287, under the Fourth Corps Area, the name Ralph S. Russell, First Lieutenant, Ocala, Fla., should have been Alexander F. Russell, First Lieutenant, Dover, Tenn.

SEVENTH CORPS AREA

The following additional medical reserve corps officers had been ordered to active duty by the Commanding General, Seventh Corps Area, up to January 3. The Seventh Corps Area comprises the states of North Dakota, South Dakota, Minnesota, Nebraska, Iowa, Kansas, Missouri, Arkansas, and Wyoming.

BAKER, Roscoe Edward, Captain, Winigan, Mo., Carlisle Barracks, Pa.
BROWN, Merle J., Captain, Davenport, Iowa, Carlisle Barracks, Pa.
BURST, Emil Andrew, Captain, St. Louis, Camp Grant, Ill.
CAVANOR, Frank Tracy, Captain, Minneapolis, Carlisle Barracks, Pa.
CONLIN, Leo James, 1st Lieut., St. Paul, Carlisle Barracks, Pa.
CORN, Henry Herman, 1st Lieut., Des Moines, Iowa, Carlisle Barracks, Pa.
FRANK, Harold Joseph, 1st Lieut., New Prague, Minn., Carlisle Barracks, Pa.
GARROW, Douglas Moore, 1st Lieut., St. Paul, Carlisle Barracks, Pa.
HAINES, Diedrich Jansen, 1st Lieut., Des Moines, Iowa, Camp Grant, Ill.
HALL, Durward Gorham, 1st Lieut., Springfield, Mo., Camp Grant, Ill.
HANSER, Samuel Albert, 1st Lieut., St. Louis, Camp Grant, Ill.
HAYS, Albert Theodore, 1st Lieut., Minneapolis, Carlisle Barracks, Pa.
HENRICH, Leo Charles, 1st Lieut., Omaha, Carlisle Barracks, Pa.
HUDGEL, Lawrence Eugene, 1st Lieut., North Platte, Neb., Carlisle Barracks, Pa.
HUNTER, Martin Peters, 1st Lieut., Moberly, Mo., Camp Grant, Ill.
HYDE, Marshall Earl, 1st Lieut., Augusta, Kan., Carlisle Barracks, Pa.
KELLING, Jordan Albert, Captain, Waverly, Mo., Carlisle Barracks, Pa.
LOTMAN, Harry Alfred, 1st Lieut., Lincoln, Neb., Carlisle Barracks, Pa.
LYDDON, Donald Withers, 1st Lieut., St. Louis, Camp Grant, Ill.
MARTIN, Melvin Cecil, Captain, Newton, Kan., Carlisle Barracks, Pa.
McCARTY, Dale Charles, 1st Lieut., Anthony, Kan., Carlisle Barracks, Pa.
McCOMAS, Marmaduke D., Captain, Courtland, Kan., Carlisle Barracks, Pa.
MEANY, John Joseph, 1st Lieut., St. Louis, Camp Grant, Ill.
MEINBERG, William Henry, 1st Lieut., St. Louis, Camp Grant, Ill.
MIDDLEMAN, Isadore Carl, Captain, St. Louis, Carlisle Barracks, Pa.
MOBLEY, Hugh, 1st Lieut., Searcy, Ark., Carlisle Barracks, Pa.
MULLIGAN, Arthur Montgomery, Captain, Brainard, Minn., Carlisle Barracks, Pa.
NEDERHISER, Morgan Ira, 1st Lieut., Cascade, Iowa, Carlisle Barracks, Pa.
POE, John Selden, 1st Lieut., St. Louis, Camp Grant, Ill.
POTASHNICK, Robert, 1st Lieut., St. Louis, Camp Grant, Ill.
RICHMOND, Paul Carlton, 1st Lieut., New Hampton, Iowa, Camp Grant, Ill.
SALMON, David D., 1st Lieut., Little Rock, Ark., Carlisle Barracks, Pa.
SANDRITTER, Gilbert Lee, 1st Lieut., Norfolk, Neb., Carlisle Barracks, Pa.
SCHILLING, Robert Dean, 1st Lieut., Clayton, Mo., Carlisle Barracks, Pa.
SETTLE, Emmett Bird, Captain, Rockport, Mo., Carlisle Barracks, Pa.
SHERMAN, Kenneth Eugene, 1st Lieut., Sturgis, S. D., Carlisle Barracks, Pa.
SIMONTON, Kinsey MacLeod, 1st Lieut., Rochester, Minn., Camp Grant, Ill.
SMITH, Frederick Abbott, 1st Lieut., Rochester, Minn., Camp Grant, Ill.
STERNHILL, Isaac, Captain, Council Bluffs, Iowa, Camp Grant, Ill.
STILL, Richard Mathias, 1st Lieut., Lincoln, Neb., Camp Grant, Ill.
STRATHERN, Carleton Schleuder, 1st Lieut., St. Peter, Minn., Camp Grant, Ill.
SULEK, Arthur Edward, 1st Lieut., Cedar Rapids, Iowa, Carlisle Barracks, Pa.
SWANSON, Paul Edgar, 1st Lieut., Virginia, Minn., Camp Grant, Ill.
UIHLEIN, Alfred, 1st Lieut., Rochester, Minn., Camp Grant, Ill.
VAUGHN, Louis Dysart, 1st Lieut., Rochester, Minn., Camp Grant, Ill.
WAKEMAN, Everal Marion, 1st Lieut., Fowler, Kan., Carlisle Barracks, Pa.
WETRICH, Max Franklin, 1st Lieut., West Des Moines, Iowa, Camp Grant, Ill.
WICKS, Ralph Litton, 1st Lieut., Winterset, Iowa, Carlisle Barracks, Pa.

EIGHTH CORPS AREA

The following additional medical reserve corps officers had been ordered to active duty by the Commanding General, Eighth Corps Area, up to January 3. The Eighth Corps Area comprises the states of Colorado, Arizona, New Mexico, Oklahoma and Texas.

ADAMS, Freeman H., 1st Lieut., Phoenix, Ariz., Station Hospital, Fort Sill, Okla.
ASHMORE, Alvin Jackson, 1st Lieut., Corpus Christi, Texas, Station Hospital, Fort Sam Houston, Texas.
BARNACLE, Clarke H., Captain, Denver, Station Hospital, Fort Sam Houston, Texas.
Barnes, Johnson Peyton, 1st Lieut., Houston, Texas, Station Hospital, Fort Crockett, Texas.
BEVIL, Lamar C., Captain, Beaumont, Texas, Station Hospital, Fort Crockett, Texas.
BISHOP, Calmes P., 1st Lieut., Picher, Okla.
BLOCK, Harold M., Captain, Dallas, Texas.
BRAU, John G., 1st Lieut., Dallas, Texas, Station Hospital, Fort Sam Houston, Texas.
BROCK, Ernest D., Captain, Yucca, Ariz., Fort Bliss, Texas.
BROWN, Charles H., Captain, Wichita Falls, Texas.
BROWN, Robert N., 1st Lieut., Denver.
BRYANT, George Calvin, Jr., 1st Lieut., Dallas, Texas.
BULLARD, Ray Elva, Captain, Waco, Texas.
CARSON, John M., 1st Lieut., Shawnee, Okla., Station Hospital, Fort Sill, Okla.
CHILDERS, Marvin A., Jr., Captain, San Antonio, Texas.
CLARK, Benjamin P., Captain, Okeene, Okla.
CONTE, Raphael, 1st Lieut., Houston, Texas.
DAILY, Robert W. L., 1st Lieut., Wichita Falls, Texas, Station Hospital, Fort Sam Houston, Texas.
DATHE, Richard Arthur, 1st Lieut., Dallas, Texas, Station Hospital, Fort Sam Houston, Texas.
DAY, Merriwether L., 1st Lieut., Phoenix, Ariz.
DEATHERAGE, William R., Captain, Dallas, Texas.
DELANEY, Albert Lindsay, Captain, Liberty, Texas, Station Hospital, Fort Crockett, Texas.
DeLANGE, Arnott, 1st Lieut., Galveston, Texas.
DETER, Russell Lee, 1st Lieut., Dallas, Texas, Station Hospital, Fort Sam Houston, Texas.
DONNELLY, Allen Dalton, 1st Lieut., Honey Grove, Texas.
DOYLE, William Henry, Captain, Muskogee, Okla., Station Hospital, Fort Sill, Okla.
ENGLAND, Myron C., 1st Lieut., Woodward, Okla., Station Hospital, Fort Sam Houston, Texas.
ENGLISH, Otis W., Captain, Lubbock, Texas.
ESPEY, James G., Jr., 1st Lieut., Trinidad, Colo.
ETTER, Edward F., Captain, Sherman, Texas, Station Hospital, Fort Sam Houston, Texas.
EWERT, William A., 1st Lieut., Kingsville, Texas.
GALT, Sidney, Captain, Dallas, Texas, Station Hospital, Fort Sam Houston, Texas.
GANDY, Daniel Truett, Major, Houston, Texas, Station Hospital, Fort Crockett, Texas.
GARNETT, John Wilson, Jr., Captain, Fort Worth, Texas, Station Hospital, Fort Sill, Okla.
GERSH, Isadore, 1st Lieut., Denver, Station Hospital, Fort Sill, Okla.
GIBBENS, Murray E., 1st Lieut., Denver.
GIERE, Carl N., 1st Lieut., El Paso, Texas.
GLASIER, William Albert, 1st Lieut., Carlsbad, N. M., Fort Bliss, Texas.
GLATHAR, Albert William, 1st Lieut., Pueblo, Colo., Fort Bliss, Texas.
GONZALEZ, Saturnino M., 1st Lieut., Santa Fe, N. M.
HARRISON, Ben F., Jr., 1st Lieut., Dallas, Texas.
HAYES, Elmer R., 1st Lieut., Greenville, Texas.
HAYNES, Elmer, 1st Lieut., Rusk, Texas, Station Hospital, Fort Sam Houston, Texas.
HILL, Kenneth A., Major, Denver.
HOWARD, Robert Bruce, 1st Lieut., Oklahoma City, Station Hospital, Fort Sam Houston, Texas.
HUCHERSON, Denman Carter, 1st Lieut., Oklahoma City, Station Hospital, Fort Sam Houston, Texas.
HUGHES, Sidney W., 1st Lieut., Brownwood, Texas, Station Hospital, Fort Crockett, Texas.
HYSLOP, James R., 1st Lieut., El Paso, Texas, Station Hospital, Fort Sill, Okla.
JAEHNE, Robert J., 1st Lieut., Austin, Texas.
JAFFA, Bertram B., Captain, Denver.
JANUARY, Harold L., 1st Lieut., Albuquerque, N. M., Station Hospital, Fort Crockett, Texas.
JOHNSON, Emmett Root, 1st Lieut., Brush, Colo.

JONES, Dean Bigham, 1st Lieut., Dublin, Texas., Station Hospital, Fort Sam Houston, Texas.
JONES, Ernest W., Captain, Kenedy, Texas.
KAPLAN, Hyman J., Captain, Orange, Texas.
KIMBALL, Merritt H., 1st Lieut., Denver.
KOOTSEY, J. S., Captain, Houston, Texas.
KROOVAND, William Harold, 1st Lieut., Oklahoma City.
LAMB, Marvin, 1st Lieut., Jacksonville, Texas, Station Hospital, Fort Sill, Okla.
LEGGETT, Milbourne Kerlic, 1st Lieut., Houston, Texas, Station Hospital, Fort Crockett, Texas.
LEHMAN, Herman O., 1st Lieut., Portales, N. M.
LO BELLO, Leon, 1st Lieut., Dallas, Texas, Station Hospital, Fort Sam Houston, Texas.
LOVELESS, Robert Wells, 1st Lieut., Lamesa, Texas.
LYONS, Dave J., Captain, Seminole, Okla.
MAGRISH, Philip, 1st Lieut., San Antonio, Texas.
MANSKE, Gerhard Rudolph, 1st Lieut., Texas City, Texas, Station Hospital, Fort Crockett, Texas.
MANSUR, Harl D., Jr., 1st Lieut., Big Springs, Texas.
MARIL, Joseph J., 1st Lieut., Oklahoma City, Station Hospital, Fort Sill, Okla.
MARX, Melvin, Jr., Captain, Clarksville, Texas.
MAXFIELD, James Robert, Jr., Captain, Albuquerque, N. M., Station Hospital, Fort Sill, Okla.
McDougal, Luther Love, Jr., 1st Lieut., Paris, Texas, Station Hospital, Fort Sill, Okla.
McFADDEN, Candour Alfred, 1st Lieut., Abilene, Texas, Fort Bliss, Texas.
McGLONE, Frank, 1st Lieut., Denver, Station Hospital, Fort Sam Houston, Texas.
McMILLAN, James M., 1st Lieut., Vinita, Okla., Station Hospital, Fort Sill, Okla.
MILLER, Robert A., 1st Lieut., San Antonio, Texas.
MONROE, M. L., 1st Lieut., Jasper, Texas.
MONSALVO, Rudolph Nieves Orozco, Captain, San Antonio, Texas.
MONTGOMERY, Eugene Porter, 1st Lieut., Boston.
MONTGOMERY, William David, 1st Lieut., Dallas, Texas.
MORGAN, Thomas L., 1st Lieut., Hobbs, N. M.
MURPHY, Joseph B., 1st Lieut., Dallas, Texas.
OAKES, Harold F., 1st Lieut., El Paso, Texas.
PACKARD, Duan E., 1st Lieut., Kerrville, Texas.
PALMER, Joseph Woodrow, 1st Lieut., San Antonio, Texas, Station Hospital, Fort Sam Houston, Texas.
PATTERSON, Robert Thomas, 1st Lieut., Houston, Texas, Station Hospital, Fort Crockett, Texas.
PERRY, Herbert Allen, 1st Lieut., Medical Lake, Wash., Fort Bliss, Texas.
PETER, James R., 1st Lieut., Ennis, Texas, Fort Bliss, Texas.
PEYTON, John Bailey, 1st Lieut., Dallas, Texas.
POLSON, Donald A., 1st Lieut., Phoenix, Ariz.
REITZ, Percy Allison, Captain, Pittsburg, Texas., Station Hospital, Fort Sill, Okla.
RICHARDS, John T., 1st Lieut., Rockdale, Texas.
RICHIE, George T., 1st Lieut., Denver.
RILEY, Edgar Davis, 1st Lieut., Terrell, Texas, Fort Bliss, Texas.
ROBBINS, Jacob Ben, 1st Lieut., El Paso, Texas, Station Hospital, Fort Sam Houston, Texas.
ROBINETT, James Bradley, Jr., 1st Lieut., Houston, Texas, Station Hospital, Fort Sill, Okla.
ROUTON, Benjamin C., 1st Lieut., Oklahoma City.
RUCKER, Ralph W., 1st Lieut., Bartlesville, Okla., Station Hospital, Fort Sill, Okla.
SHADDOCK, Carroll Bitting, Jr., 1st Lieut., Beaumont, Texas, Station Hospital, Fort Sam Houston, Texas.
SHIVERS, George Clausman, Captain, Colorado Springs, Colo.
SMITH, Carlton E., 1st Lieut., Henryetta, Okla.
SMITH, Hashell, 1st Lieut., Stillwater, Okla., Station Hospital, Fort Sill, Okla.
STANSELL, Paul Q., Captain, San Antonio, Texas.
STEINBERG, F. William, 1st Lieut., San Antonio, Texas, Station Hospital, Fort Sill, Okla.
STEVENSON, Walter H., Captain, El Paso, Texas.
STONE, Joseph R., 1st Lieut., San Antonio, Texas, Station Hospital, Fort Sam Houston, Texas.
TALKINGTON, Perry Clement, 1st Lieut., Dallas, Texas, Station Hospital, Fort Sam Houston, Texas.
TAYLOR, William A., Captain, Mount Pleasant, Texas.
TERRY, Robert T., Captain, Denver.
TRIMBLE, Orman Hughes, 1st Lieut., Greenville, Texas, Station Hospital, Fort Sam Houston, Texas.
VAN SICKLE, Rayburn Jefferson, 1st Lieut., Longview, Texas.
WALKER, Glen H., 1st Lieut., Coolidge, Ariz., Fort Bliss, Texas.
WALKER, Newton F., 1st Lieut., El Paso, Texas, Station Hospital, Fort Sam Houston, Texas.
WALLACE, Henry G., 1st Lieut., Borger, Texas.
WALTRIP, Powhatan M., Jr., 1st Lieut., Fort Worth, Texas, Station Hospital, Fort Sill, Okla.
WATSON, Isaac Newton, 1st Lieut., Edmond, Okla., Station Hospital, Fort Sill, Okla.
WEAVER, William Niehuhr, 1st Lieut., Muskogee, Okla., Station Hospital, Fort Sill, Okla.
WILKOFF, Myron, 1st Lieut., Denver.
WOOTEN, James Harbert, Jr., 1st Lieut., Fort Worth, Texas, Station Hospital, Fort Sill, Okla.

Orders Revoked

Orders on the following officers previously reported have been revoked:

ANGUS, Howard, 1st Lieut., Lawton, Okla.
BALDRIDGE, Max, 1st Lieut., Bowie, Texas.
BUKOWSKI, Lucian M., Captain, Houston, Texas.
BURNETT, Berry H., Lieut. Col., Englewood, Colo.
DIMOND, Edgar A., 1st Lieut., Muskogee, Okla.
GALLAGHER, C. A., 1st Lieut., Oklahoma City.
LEIGHT, Sidney B., 1st Lieut., Denver.
PRIDAY, Cedric, Major, Corpus Christi, Texas.
PROSSER, Moorman P., 1st Lieut., Norman, Okla.
SANFORD, Herbert M., 1st Lieut., Perryton, Texas.
WAGNER, Gerald W., 1st Lieut., McKinney, Texas.

NINTH CORPS AREA

The following additional medical reserve corps officers had been ordered to extended active duty by the Commanding General, Ninth Corps Area, up to January 4. The Ninth Corps Area comprises the states of Washington, Montana, Oregon, Nevada, Utah, California and Idaho.

ABDO, Francis J., 1st Lieut., Los Angeles, Fort Winfield Scott, Calif. (Temporary duty at Fort MacArthur pending final physical examination.)
ADAMS, John Martin, Captain, Klamath Falls, Ore., Fort Lewis, Wash.
ATKINSON, Russell E., 1st Lieut., San Bernardino, Calif., 19th Engineers, Presidio of Monterey, Calif.
BREE, Donald W., 1st Lieut., Portland, Ore., Fort Lewis, Wash.
CONNERS, T. P., 1st Lieut., Tonasket, Wash., Fort Lewis, Wash.
COMORE, Jules B., 1st Lieut., San Francisco, Camp San Luis Obispo, Calif.
COPELAND, Joseph, 1st Lieut., Visalia, Calif., 7th Division, Fort Ord, Calif.
COVERSTONE, Vernon A., 1st Lieut., Spokane, Wash., Fort Lewis.
CUNNINGHAM, Ralph T., 1st Lieut., Bakersfield, Calif., Fort MacArthur, Calif.
EDELSTEIN, Maurice, 1st Lieut., Brentwood, Calif., Presidio of Monterey, Calif.
FELDHEYM, Jean S., 1st Lieut., San Francisco, Fort Lewis, Wash.
FISHER, Arthur A., 1st Lieut., Lebanon, Ore., Fort Lewis, Wash.
FREEMAN, Ralph W., 1st Lieut., Fillmore, Utah, Fort Stevens, Ore. (Temporary duty at Fort Douglas, Utah, pending final physical examination.)
GORISHEK, William M., 1st Lieut., Castle Gate, Utah. (Temporary duty at Fort Douglas, Utah, pending final type physical examination, then to Carlisle Barracks for one month, then to Fort Francis E. Warren, Wyoming, now in 7th Corps Area.)
HARMON, Merle S., Captain, Montesano, Wash., Fort Worden, Wash.
HEDLUND, Charles, 1st Lieut., Baker, Ore., Fort Lewis, Wash.
HENNESSY, Harold R. Major, Yuba City, Calif., Northern California Military District.
HEMINGWAY, Max W., 1st Lieut., Bend, Ore., Fort Lewis, Wash.
LIGHTBURNE, William J., Captain, Palouse, Wash., Fort Lewis, Wash.
LITTLEHALES, Charles E., 1st Lieut., Portland, Ore., 7th Division, Fort Ord, Calif.
LOMAS, Jack B., 1st Lieut., Los Angeles, Presidio of Monterey, Calif.
LUND, Grant V., 1st Lieut., North Hollywood, Calif., Fort MacArthur, Calif.
MERKEL, Emil E., 1st Lieut., Los Angeles, Presidio of Monterey, Calif.
MOSS, George L., 1st Lieut., Santa Ana, Camp McQuaide, Calif.
NASH, Frank P., 1st Lieut., Townsend, Mont., Fort Stevens, Ore. (Temporary duty at Fort George Wright, Wash., pending final physical examination.)
OLSON, Oscar C., 1st Lieut., Mason City, Wash., Fort Lewis, Wash.
OLSON, William A., 1st Lieut., Los Angeles, Hearst Ranch, Jolon, Calif.
OREDSON, Gustaf A., 1st Lieut., Kimberly, Nev., Fort Lewis, Wash.
RILEY, John B., 1st Lieut., Sedro Woolley, Wash., Fort Stevens, Ore.
SCHWARTZ, Simon D., 1st Lieut., Beverly Hills, Calif., 7th Division, Fort Ord, Calif.
SLOAN, Leonard N., Major, Los Angeles, Fort Scott, Calif.
SORENSON, Edward J., 1st Lieut., Beverly Hills, Calif., Fort MacArthur, Calif.
STEHLY, Charles C., 1st Lieut., Los Angeles, Fort Scott, Calif.
STEWARD, Joseph Byron, 1st Lieut., Portland, Ore., Fort Lewis, Wash.
TAYLOR, Edward D., 1st Lieut., Centralia, Wash., Fort Lewis, Wash.
WHITTAKER, Thomas W., 1st Lieut., Los Angeles, Presidio of Monterey, Calif.
WICAL, Elvin A., 1st Lieut., Los Angeles, Camp McQuaide, Calif.
YOST, Charles W., 1st Lieut., Portland, Ore., 7th Division, Fort Ord, Calif.
YUSKIS, Anton S., 1st Lieut., San Diego, Calif., 7th Division, Fort Ord, Calif.

Relieved

OSGOOD, Samuel B., 1st Lieut., ordered to extended active duty, Sept. 30, 1940, at Presidio of Monterey, Calif., relieved from duty December 20.

Resigned

WILEY, James W., 1st Lieut., ordered to extended active duty, Nov. 14, 1940, at Fort Worden, Wash.; resigned December 24.

ORGANIZATION SECTION

MEDICAL LEGISLATION

STATE MEDICAL LEGISLATION

Massachusetts

Bills Introduced.—S. 66 proposes to grant to a registered nurse caring for a person injured through the negligence of another a lien on all rights of action, suits, claims, counterclaims or demands accruing to the injured person because of his injuries. H. 54 proposes to permit any judge in enumerated courts to commit to the McLean hospital or to a private licensed institution a person so addicted to the intemperate use of barbituric acid and its derivatives as to have lost the power of self control. H. 114, to amend the medical practice act, proposes to require every licensed physician annually during December to register with the board of registration in medicine and at that time to pay a fee of $2. H. 115, to amend those provisions of the medical practice act prohibiting a person from entering on or continuing in the practice of medicine until he has recorded with the clerk of the town where he has or intends to have an office his certificate of registration, proposes that (1) the town clerk shall certify on the face of the certificate that the recording required by law has been made, (2) the physician shall display the certificate so certified in a conspicuous place in his office and (3) a person rendering medical service without recording his certificate as here required shall recover no compensation therefor. H. 116 proposes to create a commission, consisting of a senator, three representatives and three physicians, to make an investigation and study of the advisability of requiring special qualifications of all physicians who engage in the practice of surgery and to file its recommendations with the clerk of the house of representatives on or before the first Wednesday of December 1942. H. 122 proposes to require the clerk or registrar of each city or town to give to persons who file notice of intention to marry such literature concerning gonorrhea and syphilis and the importance of premarital examination as may be furnished for that purpose by the state department of public health. H. 134 proposes to make various changes in the laws relating to food and drugs so as to make them conform substantially with those provisions of the Federal Food, Drug and Cosmetic Act pertaining to foods and drugs. H. 130 proposes to prohibit the retail sale or distribution of aminopyrine, cinchophen, barbituric acid or derivatives of those substances, except on the prescription of a physician, dentist or veterinarian.

MEDICAL BILLS IN CONGRESS

Bills Introduced.—S. 193, introduced by Senator Murray, Montana, proposes to promote the general welfare by enabling the several states to make more adequate provision for compensation for disability or death of workers from silicosis or other dust diseases, by providing for cooperation with the several states. The Secretary of Labor will be charged with the duty of administering the provisions of the act. S. 194, introduced by Senator Murray, Montana, proposes to authorize research by the United States Public Health Service with respect to the cause, diagnosis and treatment of dental diseases. S. 195, introduced by Senator Murray, Montana, proposes to impose additional duties on the United States Public Health Service in connection with the investigation, treatment and control of tuberculosis. H. R. 5, introduced by Representative Smith, West Virginia, proposes to authorize the Secretary of Interior to make or cause to be made certain inspections and investigations in coal mines for the purpose of obtaining information relating to health and safety conditions, accidents and occupational diseases. H. R. 70, introduced by Representative Elliott, California, proposes to promote the national health through the prevention and control of tuberculosis among migrants. H. R. 150, introduced by Representative Tenerowicz, Michigan, proposes to permit deductions for income tax purposes of physician's and dentist's fees, hospital and funeral expenses. H. R. 577, introduced by Representative Fitzpatrick, New York, proposes to amend the Social Security Act so as to provide for the payment of benefits to permanently and totally disabled individuals. H. R. 584, introduced by Representative Fulmer, South Carolina, proposes to promote the national health and welfare through appropriation of funds for the construction of hospitals. This bill is identical with the Wagner-George hospital construction bill as introduced in the Seventy-Sixth Congress. H. R. 992, introduced by Representative Myers, Pennsylvania, proposes to extend the federal old age benefit provisions of the Social Security Act to certain nurses in respect to their employment outside of religious, charitable and nonprofit institutions. H. R. 1052, introduced by Representative Tolan, California, proposes that chiropractors be permitted to render treatment to beneficiaries of the United States Employees Compensation Act.

OFFICIAL NOTES

RADIO BROADCASTS

"Doctors at Work" is the title of the sixth annual series of dramatized radio programs being presented by the American Medical Association and the National Broadcasting Company.

The series opened Wednesday, Nov. 13, 1940 and will run for thirty consecutive weeks, closing with a broadcast from the A. M. A. meeting at Cleveland on June 4. The program is scheduled for 10:30 p. m. eastern standard time (9:30 central, 8:30 mountain, 7:30 Pacific time) over the Blue network, other N. B. C. stations and Canadian stations.

The programs are broadcast on what is known in radio as a sustaining basis; that is, the time is furnished gratis by the radio network and local stations and no revenue is derived from the programs. Therefore, local stations may or may not take the programs, at their discretion, except those stations which are owned and operated by the National Broadcasting Company.

Some radio stations may not be able to broadcast the program at the regular time at which it is scheduled and may transcribe and broadcast it at a different hour or even on another day. It is advisable therefore to verify the time of the broadcast by reference to local newspapers or by telephoning the local Blue network stations.

The programs will dramatize what modern medicine offers the individual in the way of opportunities for better health and the more successful treatment of disease. Incidental to this main theme the programs will explain the characteristics of the different fields of modern medicine and its specialties.

Descriptive posters for local distribution may be had gratis from the Bureau of Health Education, American Medical Association, 535 North Dearborn Street, Chicago. Program titles will be announced weekly in THE JOURNAL and monthly in *Hygeia*, the Health Magazine.

Tickets are available for each broadcast. Address the Bureau of Health Education, American Medical Association, 535 North Dearborn Street, Chicago. Tickets are free, but a stamped self-addressed envelop should accompany requests.

The next three programs to be broadcast, together with their dates and titles, are as follows:

January 22. Blocking Pain.
January 29. Deeper Than It Looks.
February 5. New Faces For Old.

Medical News

(PHYSICIANS WILL CONFER A FAVOR BY SENDING FOR THIS DEPARTMENT ITEMS OF NEWS OF MORE OR LESS GENERAL INTEREST: SUCH AS RELATE TO SOCIETY ACTIVITIES, NEW HOSPITALS, EDUCATION AND PUBLIC HEALTH.)

COLORADO

Annual Midwinter Clinics—Refresher Courses.—The Colorado State Medical Society will hold its annual midwinter clinics, the ninth, in Denver February 5-7. The guest lecturers will include:

Dr. Ralph Bowen, Houston, Texas, pediatrics.
Dr. James T. Case, Chicago, radiology.
Dr. Robert L. Faulkner, Cleveland, obstetrics and gynecology.
Dr. Idys Mims Gage, New Orleans, general surgery.
Dr. Chevalier L. Jackson, Philadelphia, otolaryngology.
Dr. William S. Middleton, Madison, Wis., general medicine.
Dr. Oscar L. Miller, Charlotte, N. C., orthopedics.
Dr. Reed M. Nesbit, Ann Arbor, Mich., genito-urology.

A speaker from the U. S. Army Medical Corps will lecture on military medical subjects. Evenings will be devoted to a smoker, a symposium on cardiovascular-renal disease conducted by the guest speakers and a dinner dance. Two refresher courses, each for two full days, will be given in Denver February 3-4, immediately preceding the clinics, under the direction of the state medical society. One on "Disorders of the Heart and Circulatory System" will be given at the University of Colorado School of Medicine and hospitals, and the other, on "Diagnosis and Treatment of Fractures," will be given at the Denver General Hospital. There will also be an evening symposium on special fracture problems.

CONNECTICUT

Psittacosis Reported.—According to *Public Health Reports*, Dr. Stanley H. Osborn, Hartford, commissioner of health of Connecticut, reported, December 9, one case of psittacosis in a patient who became ill November 2. Her physician suspected psittacosis because a recently purchased parakeet, received in Springfield, Mass., from a pet shop in California in October, had been ill a few days prior to the onset of illness of the patient.

GEORGIA

Endowment for Chair in Surgery.—Emory University School of Medicine, Atlanta, has been given $100,000 by the Joseph B. Whitehead Foundation to endow further the Joseph B. Whitehead chair in surgery, newspapers report. An additional $16,500 was given to the medical school for use in connection with the chair, in memory of Conkey P. Whitehead, who died in November. The foundation was established after the death of Joseph B. Whitehead Jr., who willed his estate for the support of philanthropic and educational enterprises in the Atlanta area as a memorial to his father, Joseph B. Whitehead, one of the founders of the Coca-Cola Bottling Company. The foundation created the professorship in 1939 with an initial gift of $250,000. In 1940 trustees of the foundation voted that about $286,000 of its funds be distributed to Atlanta charitable and educational institutions before Christmas, the gifts to the university forming a part of this total.

IDAHO

Personal.—Dr. Hugh F. Stanton, St. Genevieve, Mo., has been appointed director of the Central Idaho health unit to succeed Dr. Max B. McQueen, Lewiston, who has been called to active duty with the U. S. Army.——Dr. Richard D. Simonton, Boise, captain, medical reserve corps, U. S. Army, has been chosen to be selective service medical officer for the state. He will supervise the ten medical advisory boards throughout the state and the forty-eight local examining physicians.

ILLINOIS

Society News.—The Henry County Medical Society was addressed in Kewanee recently by Drs. Leo K. Campbell and Channing W. Barrett, Chicago, on "Benefits and Dangers of Reducing" and "Preservation and Restoration of the Pelvic Floor" respectively.—— Dr. Ralph C. Brown, Chicago, discussed "Chronic Ulcerative Colitis" before the Sangamon County Medical Society in Springfield, December 5.

Chicago

The Mayo Lecture.—Dr. Stuart W. Harrington, Rochester, Minn., will deliver the annual Mayo Lecture in the library of Northwestern University Medical School, February 10. His subject will be "Diaphragmatic Hernia." This is considered the 1940 lecture.

Fellowship for Study in Rheumatic Fever.—Dr. Paolo Ravenna of Michael Reese Hospital will receive the first fellowship given by trustees of the Chicago Heart Association in memory of Morris Fishbein Jr. for research into the causes of rheumatic fever. The memorial fund was started in 1929 after the son of Dr. Morris Fishbein, Editor of THE JOURNAL, died of rheumatic fever. Dr. Ravenna graduated at Regia Università di Torina Facoltà di Medicina e Chirurgia in 1932. He was licensed to practice medicine in New York in 1940.

IOWA

Lester Tilton Cited on Contempt Charge.—Lester Tilton, Clinton, a cancer quack who had no medical or pharmaceutical training, has been cited for alleged contempt of court because he was violating a decree restraining him from practicing medicine. He was ordered to appear in the district court January 21 by Judge Frank Kelsey, the Davenport *Times* reported December 21. In 1934 a permanent injunction restraining him from practicing medicine was obtained by the state, it was reported. It was stated that while he did not have a license to practice medicine he had worked up a large cancer-cure business. Earlier in that year Tilton began serving a term of thirty days in the Scott County Jail for nonpayment of a fine of $1,000 imposed in federal court at Des Moines for violation of the federal Food and Drugs Act. Originally from Clinton, Tilton for many years exploited an alleged cure for cancer. He had an "institute" in Clinton where he treated at different times cancer, tuberculosis and syphilis. In 1933 Tilton was sentenced to serve from one to five years in the penitentiary and fined $2,000 for conspiracy to violate the Illinois medical practice act.

MASSACHUSETTS

Professors Dam and de Hevesy Come to Harvard.—Harvard University, Cambridge, announces that Prof. Henrik Dam, Biochemical Institute, University of Copenhagen, has been appointed Cutter lecturer on preventive medicine at the Harvard Medical School, Boston, for the current academic year and will lecture January 30 on vitamin K. Prof. George de Hevesy of the University of Copenhagen has been appointed the Dunham lecturer at Harvard for the current academic year and will deliver a series of lectures on "Application of Radioactive Isotopes to Biological Problems," beginning April 28. Professor de Hevesy discovered the element "hafnium" and introduced the application of isotopes as indicators in chemistry. These lectures are open to members of the medical profession and other interested professional persons.

MICHIGAN

Society News.—Dr. Frank H. Bethell, Ann Arbor, discussed "Anemias Related to Nutritional Deficiencies with Particular Reference to Pregnancy" before the Genesee County Medical Society in Flint, January 7.——Dr. Howard T. Karsner, Cleveland, addressed the Wayne County Medical Society, Detroit, January 6, on "Ovarian Tumors with Hormonal Sexual Dysfunction." Dr. Albert M. Snell, Rochester, Minn., addressed the society January 13 on "Recent Studies on Hepatic Disease."

Kellogg Foundation Creates New Post.—Dr. Robert B. Harkness, director of the Barry County Health Department, Hastings, has been appointed assistant field director of the W. K. Kellogg Foundation, a newly created position. Dr. Harkness will take up his new work in May. He will be succeeded in Barry County by Dr. John K. Altland, Traverse City, director of the Grand Traverse County Health Department. Dr. Harkness will assist Dr. Matthew R. Kinde, Battle Creek, field director, in administering the educational activities and services in the seven counties which make up the foundation's health project.

MINNESOTA

Lectureship in Honor of Dr. Wright.—The Twin City Urological Society has created an annual lectureship bearing the name of the late Dr. Franklin R. Wright. Although established just before Dr. Wright's recent death, announcement of the lecture has just appeared in the *Bulletin* of the Minnesota Medical Foundation. Dr. Wright had both medical and dental

degrees. He had been since 1896 a member of the faculty of the University of Minnesota Medical School, Minneapolis, until 1936, when he retired as associate professor of urology emeritus.

Society News.—The Ramsey County Medical Society, St. Paul, devoted its December 30 meeting to a symposium on fractures. The speakers were Drs. George A. Williamson, Stewart W. Shimonek, Alexander R. Colvin, Carl C. Chatterton and Victor P. Hauser.——Dr. Albert M. Snell, Rochester, discussed "Pancreatic Lithiasis" before the Minnesota Academy of Medicine, St. Paul, December 11.——Dr. Adelbert Louis Dippel, Minneapolis, discussed "X-Ray Pelvimetry" before the Hennepin County Medical Society, Minneapolis, December 18. ——Dr. Harry P. Smith, Iowa City, addressed the Minnesota Pathological Society, December 17, on "The Coagulation of Blood with Special Reference to Vitamin K Therapy."——The Minnesota Society of Obstetrics and Gynecology was addressed in Duluth, December 14, among others, by Drs. William A. Coventry, Duluth, on "Actinomycosis of the Ovary"; Claude J. Ehrenberg, Minneapolis, "A Case of Severe Dysmenorrhea and Sterility Effectively Treated with Pranone," and James R. Manley, Duluth, "Intravenous Use of Ergotrate in the Third Stage of Labor."

NEBRASKA

Promotions at the University of Nebraska.—Promotions recently announced at the University of Nebraska College of Medicine, Omaha, include:

Dr. William P. Haney, to be assistant professor of otorhinolaryngology.
Dr. Charles W. McLaughlin Jr., assistant professor of surgery.
Dr. Ernest L. MacQuiddy, associate professor of internal medicine.
Dr. Willson B. Moody, associate professor of medicine.
Dr. Reuben Allyn Moser, associate professor of internal medicine.
Dr. George E. Robertson, assistant professor of pediatrics.
Dr. Chester H. Waters, professor of surgery.

NEW JERSEY

Society News.—Brig. Gen. Shelley U. Marietta, assistant surgeon general, U. S. Army, and commanding officer of Walter Reed General Hospital, Washington, D. C., addressed the Essex County Medical Society, Newark, January 9, on "Medical Preparedness for Military Emergency."——Dr. Henry W. Cave, New York, addressed a stated meeting of the Academy of Medicine of Northern New Jersey, Newark, January 16, on "Cancer of the Colon."——Dr. Robert H. Ivy, Philadelphia, spoke on "Surgical Conditions of the Face, Mouth and Jaws" at a meeting of the Atlantic County Medical Society, Atlantic City, January 10.——Dr. William D. Stroud, Philadelphia, addressed the Camden County Medical Society, Camden, January 7, on "Treatment of Cardiovascular Disease."

NEW YORK

Rochester Water Supply Polluted.—A valve opened by mistake allowed polluted water from the Genesee River to enter the drinking water supply in Rochester for about sixteen hours, December 11, *Health News* reports. Steps to prevent outbreaks of water-borne illness were taken by health authorities, including typhoid vaccine, sufficient for treatment of 72,000 persons, shipped from the central state laboratory in Albany. Emergency chlorinators were used, and citizens were warned by radio, telephone and newspapers to boil the water. The Rochester General Hospital reported that 38 patients had symptoms of gastroenteritis that could be attributed to the contaminated water. Forty nurses were affected, with twenty-seven off duty at one time. It was estimated that more than 1,000 persons coasulted physicians for mild gastroenteritis. No typhoid had been reported up to December 31.

New York City

Dr. Williams to Lecture on Diet.—Robert R. Williams, Sc.D., chemical director of the Bell Telephone Laboratories, will deliver a lecture before the Greater New York Dietetic Association, February 4, on "The Evolution of Man's Dietary Requirements." Dr. Williams is known especially for his research on vitamin B. In 1938 he received the Willard Gibbs Medal of the Chicago section of the American Chemical Society in recognition of his work in the isolation and later synthesis of the vitamin.

Social Hygiene Week Activities.—The bureau of social hygiene of the New York City Department of Health will present an extensive program of educational activities for physicians, medical students, nurses, laboratory and public health workers during "Social Hygiene Week," January 29 to February 6. There will be all day programs at the health department building January 29, 30 and 31, and one including special events for the public February 6. In addition there will be an evening meeting at the New York Academy of Medicine, February 4, and an all day social hygiene conference at the Hotel Astor on February 5.

Society News.—Dr. Malcolm Goodridge was elected president of the New York Academy of Medicine for a term of two years at a meeting, December 5, and Dr. Henry W. Cave, vice president for a term of three years.——Capt. Edward C. White, Medical Corps, U. S. Navy, addressed the Medical Society of the County of New York, December 23, on "Medical Preparedness in the Navy," and Col. Frank W. Weed, Medical Corps, U. S. Army, "The Medical Department of the Expanded Army."——Drs. Currier McEwen, Daniel Murray Angevine and Haig H. Kasabach presented a symposium on arthritis before the New York Roentgen Society, December 16.

PENNSYLVANIA

Society News.—Dr. William Wayne Babcock, Philadelphia, addressed the annual meeting of the Lycoming County Medical Society, Williamsport, January 10, on "Current Medicosurgical Topics." Dr. Nathan B. Van Etten, New York, President of the American Medical Association, spoke at the annual banquet on "An American Health Program." Drs. Babcock and Francis F. Borzell, Philadelphia, president of the Medical Society of the State of Pennsylvania, made brief addresses.——Dr. Leo D. O'Donnell, Pittsburgh, addressed the Washington County Medical Society, Washington, January 8, on "Injuries to the Knee Joint."

Philadelphia

Lectures of the College of Physicians.—Lectures to be presented before the College of Physicians of Philadelphia during the remainder of the year will be as follows:

Dr. Thomas T. Mackie, New York, Studies in Ulcerative Colitis, the Mary Scott Newbold Lecture, February 3.
Dr. Ernest W. Goodpasture, Nashville, Tenn., The Cell-Parasite Relationship in Bacterial and Virus Diseases, the Alvarenga Prize Lecture, March 5.
Dr. George L. Streeter, Baltimore, New Data on Embryogenesis in Monkey and Man, the Nathan Lewis Hatfield Lecture, April 2.
Henry F. Vaughan, Dr.P.H., Detroit, The Way of Public Health, the James M. Anders Lecture, May 7.

Pittsburgh

University to Have Cyclotron.—A gift of $50,000 has been presented to the University of Pittsburgh for the construction of a cyclotron, the atom-smashing machine, in a special building near the medical center on O'Hara Street under the direction of Alexander J. Allen, Ph.D., associate professor of physics. Construction is expected to take about one year. Research projects now in progress at the university which have need for the cyclotron include cancer research, vitamin research and animal nutrition, studies of fertilized egg cells, the physics of metals and various biophysical researches.

TEXAS

Gift to Establish Serum Center.—A gift of $10,000 for the establishment of a blood, plasma and serum center at Baylor Hospital, Dallas, presented by Dr. and Mrs. Stanley J. Seeger, Milwaukee, was announced on December 25. The gift was made through the Southwestern Medical Foundation, of which Dr. Edward H. Cary, Dallas, is president, and will be a memorial to Mrs. Seeger's father, the late William Buchanan of Texarkana. The new center will expand the present activities of the hospital in preparing blood and plasma for transfusions. At the time the Seeger gift was announced, Dr. Cary suggested that blood be collected from volunteers to be shipped to England through the Dallas chapter of the British War Relief Society. Dr. Seeger is chairman of the Council on Industrial Health of the American Medical Association.

Dallas Spring Clinical Conference.—The thirteenth Annual Spring Clinical Conference of the Dallas Southern Clinical Society will be held at the Hotel Adolphus, Dallas, March 17-20. The honor guests will be:

Dr. Clifford J. Barborka, associate in medicine, Northwestern University Medical School, Chicago.
Dr. William E. Chamberlain, professor of radiology and roentgenology, Temple University School of Medicine, Philadelphia.
Dr. Harry Goldblatt, professor of experimental pathology and associate director, Institute of Pathology, Western Reserve University School of Medicine, Cleveland.
Dr. Leland S. McKittrick, instructor in surgery, Harvard Medical School, Boston.
Dr. Norman F. Miller, professor and head of the department of obstetrics and gynecology, University of Michigan Medical School, Ann Arbor, Mich.
Dr. John J. Morton, professor of surgery, University of Rochester School of Medicine and Dentistry, Rochester, N. Y.

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Dr. Henry G. Poncher, associate professor of pediatrics, University of Illinois College of Medicine, Chicago.

Dr. James C. Sargent, clinical professor and director of the division of urology, Marquette University School of Medicine, Milwaukee.

Dr. Marion B. Sulzberger, assistant clinical professor of dermatology and syphilology, New York Post-Graduate Medical School, Columbia University, New York.

Dr. Derrick T. Vail Jr., professor and head of the department of ophthalmology, University of Cincinnati College of Medicine, Cincinnati.

Dr. Soma Weiss, Hersey professor of the theory and practice of physic, Harvard Medical School, Boston.

Dr. Fletcher D. Woodward, professor of diseases of the ear, nose and throat, University of Virginia Department of Medicine, Charlottesville.

VIRGINIA

New Medical College Hospital Dedicated.—The Medical College of Virginia, Richmond, dedicated a new six hundred bed hospital on December 5, which was Founders Day at the college. The dedicatory exercises were held in the Monumental Episcopal Church near the college, with Col. E. W. Clark, commissioner of public works of the Public Works Administration, as the principal speaker. William T. Sanger, L.H.D., president of the college, presided and the speakers included Gov. James H. Price; Dr. Douglas Vanderhoof, Richmond, chairman of the executive committee board of visitors; Dr. Walter L. Bierring, Des Moines, Iowa, former President of the American Medical Association; Dr. Walter B. Martin, Norfolk, president of the Medical Society of Virginia; Harvey E. Jordan, Ph.D., dean, University of Virginia Department of Medicine, Charlottesville; Mr. M. Haskins Coleman Jr., secretary, Richmond Hospital Council, and Dr. Lewis E. Jarrett, director of the hospital division of the college. Rev. George Ossman, rector of the Monumental Episcopal Church, delivered the invocation and the benediction. The new hospital building, said to be the largest steel supported structure in the state, cost $2,500,000. Part of the cost was provided by a grant of $1,144,800 from PWA. The remainder came from the state, gifts and loans. The construction is in the form of a Maltese cross with the utility services in the center and the rooms for patients in the wings. By this arrangement wards and rooms have outside exposure. Teaching patients are to be segregated from private patients by the provision of separate entrances and lobbies. Equipment has been installed for air conditioning, and in the beginning the first and eleventh floors (the operating floors) will be cooled in summer. Two new services, neuropsychiatry and contagious diseases, have been provided for in the hospital. A landmark air beacon, constructed to government specifications, has been placed on the roof.

GENERAL

Examinations in Obstetrics and Gynecology.—The American Board of Obstetrics and Gynecology announces that general oral and pathological examinations (Part II) for all candidates (Groups A and B) will be conducted at Cleveland from May 28 to June 2 prior to the annual session of the American Medical Association. Application for admission to Group A, Part II, examinations must be filed with the secretary not later than March 1. Formal notice of time and place will be sent to candidates in advance of the dates. Candidates for reexamination must apply to the secretary before April 15. Application forms and information may be obtained from the secretary, Dr. Paul Titus, 1015 Highland Building, Pittsburgh (6).

Publications of the Children's Bureau.—A directory of state, county and municipal training schools caring for delinquent children in the United States has been published by the Children's Bureau, U. S. Department of Labor. The section on state schools lists 115 institutions in the forty-eight states, the District of Columbia, Hawaii and Puerto Rico. The section on county and municipal schools lists forty-three that reported care of delinquent children following court disposition. Detention homes and other institutions reported as providing only temporary care are excluded. The population of the state schools, June 30, 1939, was 28,652 and that of the county and municipal ones was 3,945. Another recent publication of the bureau is the Proceedings of the White House Conference on Children in a Democracy held in Washington, Jan. 18-20, 1940, issued as Children's Bureau Publication 266.

Prevention of Blindness—Annual Meeting.—Mr. Mason H. Bigelow, a New York attorney, was elected president of the National Society for the Prevention of Blindness at the annual meeting in New York, December 12. He succeeds Mr. William Fellowes Morgan, who retired after serving the entire twenty-five years of the society's history. Mr. Morgan will have the title of president emeritus. Dr. Edward C. Ellett, Memphis, was elected a vice president to fill the vacancy left by the recent death of Dr. Francis Park Lewis, Buffalo. The program of the meeting was "The Heritage Left to Coming Generations by Dr. Park Lewis," with Drs. Eliott B. Hague, Buffalo, and Ellice M. Alger, New York, Mr. Lewis H. Carris, general director of the society, and Mr. Charles Franchot, New York attorney, as the speakers. The society recently moved its headquarters with other members of the National Health Council to 1790 Broadway.

Sectional Meeting on Ear, Nose and Throat.—The Western Section of the American Laryngological, Rhinological and Otological Society will meet in San Francisco, February 1-2. A symposium on therapy of diseases of the ear, nose and throat will be presented the first day by Drs. Walter P. Covell, San Francisco, on vitamin therapy; Maurice L. Tainter, San Francisco, pharmacology of vasoconstrictor drugs; Edwin E. Osgood, Portland, Ore., chemotherapy; Leo Henry Garland, San Francisco, roentgen therapy, and Karl F. Meyer, Ph.D., San Francisco, serum therapy. Among speakers the second day will be:

Dr. H. Brodie Stephens, San Francisco, Operative Treatment of Carcinoma of the Esophagus.

Dr. Howard A. Brown, San Francisco, Post-Traumatic Syndrome of Head Injuries.

Dr. Henry J. Profant, Santa Barbara, Calif., Brain Abscesses with Recovery.

Epidemic of Influenza Moves Eastward.—The U. S. Public Health Service reports that the epidemic of influenza, prevalent for some weeks in the Western states, is moving eastward. A total of 77,144 cases was reported for the country as a whole on January 4. The number of cases is below the 1932 peak of 90,000 and the 1929 maximum of 195,000, according to the New York *Times*. Prevalence in California reached a peak of 13,133 cases in the week ended December 14, after which it declined to 3,030 cases for the week ended January 4. In the week ended December 21, Louisiana reported 8,000 cases. This total rose to 32,985 the following week but for the week ended January 4 declined to 7,307. On the Eastern seaboard the disease has not reached the proportions which result in reports from state authorities in New York, Massachusetts, New Hampshire, Pennsylvania and Delaware. However, New York City, which reports separately, listed 77 cases for the week ended January 4 as against 32 the week before. The present prevalence of the disease is slight in other areas of the Northeast thus far, it was stated. The National Youth Administration for New York City announced that, because of the prevalence of influenza in Maine, it was postponing the departure of two hundred and fourteen youths scheduled to leave January 7 for the Quoddy regional project at Eastport.

Deaths in Other Countries

Prof. Jacques Arsène d'Arsonval, who introduced the use of high frequency current into the treatment of disease, died recently at his home near Limoges, France, the New York *Times* reported January 1. Born in 1851, d'Arsonval graduated in medicine at the Collège de France in Paris, with which he was associated for more than sixty years. He worked as assistant to Claude Bernard and later with Brown-Séquard, whom he succeeded as professor on the latter's death in 1897.

Government Services

Occupational Therapy and Recreational Aides Needed

The U. S. Civil Service Commission announces that it is accepting applications for the positions of occupational therapy aides and recreational aides. There are two grades of occupational therapy aide, full grade at $1,800 and junior grade at $1,620 a year. Applicants must have had fourteen units of high school study; otherwise they must pass a written general test. All applicants will be rated on their education and experience as shown in their applications and in corroborative evidence. They must not have passed their forty-fifth birthday, but this age limit does not apply to veterans granted veteran preference, up to retirement age. Applications must be on file with the commission's Washington office not later than February 10 if received from states east of Colorado and February 13 if received from Colorado and states westward. Further information may be obtained from the secretary of the Board of U. S. Civil Service Examiners at any first or second class post office or from the U. S. Civil Service Commission, Washington, D. C.

Foreign Letters

AUSTRALIA

(From Our Regular Correspondent)

Sept. 25, 1940.

New Light on Poliomyelitis

From experimental investigations carried out at the Walter and Eliza Hall Institute, Melbourne, following the epidemic of poliomyelitis in Victoria in 1937-1938, Dr. F. M. Burnet has drawn the conclusion that the virus of poliomyelitis has undergone a change. In the first place no abnormality was found in the olfactory bulbs of 10 out of 11 patients who died in the acute phase of the disease. This observation, combined with the frequency with which the virus was found in tonsils, nasopharyngeal washings and feces, points rather to other channels of invasion than to the generally accepted path of the olfactory bulbs. Changes have also been observed in the age distribution of the disease. Up to 1920 the epidemic age distribution was different from that of other acute infectious diseases. It was a disease of very young children. In several epidemics since 1920 the age incidence has altered, and it now closely resembles that of the other common infectious illnesses of childhood. Further differences between the old type of disease and that of the Victorian epidemic were noticed. Few victims escaped paralysis and there was little evidence to suggest that symptomless adults disseminated the infection. Burnet concludes that before 1920 the virus was one of low virulence but high infectivity, causing widespread and recurrent infection of both adults and children, invading the pharyngeal mucosa and only rarely revealing itself by paralysis. On the other hand, he suggests that the virus is now accommodating itself to changes in the environment and personal habits of civilized communities by becoming more definitely neurotropic and at the same time less infective and less antigenic. The widespread adult reservoir of adult infection is disappearing; thus there is less exposure of very young children, and the early school ages when random contacts increase are most affected.

Medical Practice in New Zealand

New Zealand celebrates this year the one hundredth anniversary of its becoming a colony of the British Empire. The dominion has acquired a system of medical practice in many respects unique, developed to meet the demand of a scattered population of just over one million people more or less remote from other medical centers. Medical training is available through the University of New Zealand, an examining body with six constituent colleges; a medical student may do his first year's work at any one of the four chief colleges, situated in Auckland, Dunedin, Christchurch and Wellington respectively. From his second to his fifth year he attends the Otago National Medical School in Dunedin, and for his sixth (clinical) year he may choose the public hospital in any one of the four cities mentioned. The number of students in each year has fluctuated between thirty and a hundred in the past twenty years. Well-to-do parents are perhaps not so much a prerequisite for medical training in New Zealand as in Europe; many students can live at home and plenty of government scholarships are available. In the early years of training, students can augment their resources by working in the country during their long vacation.

Comparatively little has been attempted in the way of original research or investigation in New Zealand, and there are few appointments for full time research work. Nor has postgraduate education been attempted. Up till twenty years ago most students went to England to qualify and there is still a strong tendency for them to go abroad after a year or two as hospital residents and before settling into practice. They usually spend from one to five years in England or America, taking resident posts and working for a higher degree. Many, of course, never return to New Zealand but find opportunities elsewhere for special work. Those who do return usually are obliged to enter general practice, there being only a limited number of specialist appointments available. The duties falling to general practitioners in New Zealand include lodge practice (which is equivalent to panel practice), anesthetics and obstetrics. Also one may hold an appointment as senior surgeon at a public hospital and teach clinical surgery to the final year students. Owing to the great diversity of demands made on the general practitioner, the general standard of practice is probably higher than in older countries.

The public hospitals in New Zealand were founded as government institutions, in the first place to care for the Maoris, but later the poorer members of the white community made use of them. It was hoped that they would be supported by voluntary contributions and rates, but these sources proved insufficient and the government has had to assume greater responsibility for them. In 1939 under the national insurance scheme, hospital benefits were made available to all: out of a fund raised from taxation and compulsory contributions the government pays the hospital 6 shillings a day for every patient. Every citizen has a right to avail himself of the services of a public hospital, including those of the consultant staff, but private hospitals exist for those who wish to use them. Many of the well-to-do group, however, now make use of the public hospitals, and the payment offered to hospital consultants will offset the financial disadvantages they have hitherto suffered on this account.

Influenza Virus Infections of the Chick Embryo Lung

F. M. Burnet, working at the Walter and Eliza Hall Institute, Melbourne, has made a valuable discovery regarding the use of chick embryo in the experimental study of the viruses. In the *British Journal of Experimental Pathology* (**21**:147 [June] 1940) he reports that influenza virus strains can be propagated in chick embryos without preliminary adaptation when the inoculation is made through the amniotic cavity. This work is of possible importance for two reasons. First, Burnet has successfully infected chick embryo with material of human origin which has passed through only one ferret. He is optimistic that viruses obtained directly from human beings would infect equally well, though he has not yet had an opportunity to test the point. Such a rapid and reliable means of recognizing influenza virus infection in man would be of great practical value. Second, the new method offers a possible means for the isolation of some of those viruses, other than the virus of epidemic influenza, which produce respiratory disorders in man but which so far have eluded study because no susceptible test animal has been discovered. Another potentiality is the production of antigenic material from virus as little removed from the original human type as possible. In the event of a pandemic due to an antigenically new type of influenza virus, it might be of greatest value to be in a position to produce large quantities of virus.

Marriages

Thomas Edward Fulghum to Miss Sara Martha Griffith, both of Atlanta, Ga., in Columbia, S. C., Sept. 29, 1940.

Thomas S. Boozer, Talledega, Ala., to Miss Sabra Thrasher of Birmingham in Montgomery, Aug. 18, 1940.

James D. Biles Jr., Memphis, Tenn., to Miss Elizabeth Hough Boone of Seattle, Sept. 7, 1940.

S. Roy Higginbotham Jr., Tampa, Fla., to Miss Esther E. Byrnes of Atlanta, Ga., Sept. 4, 1940.

Norton Frierson Jr., Atlanta, Ga., to Miss Emily Dean of Rockmart in August 1940.

Helene N. Boyer to Mr. Temple Neiter, both of Racine, Wis., Aug. 24, 1940.

Deaths

Emory Hill ● Richmond, Va.; Medical College of Virginia, Richmond, 1907; member of the House of Delegates of the American Medical Association in 1924 and from 1934 to 1936; member of the American Academy of Ophthalmology and Otolaryngology; member and formerly secretary of the American Ophthalmological Society; past president of the Virginia Society of Otolaryngology and Ophthalmology; fellow of the American College of Surgeons; instructor of ophthalmology at Rush Medical College, Chicago, from 1914 to 1919; emeritus professor of ophthalmology at his alma mater; ophthalmologist, Johnston-Willis Hospital and Tucker Sanatorium; consulting ophthalmologist, Hospital Division, Medical College of Virginia; aged 57; died, Dec. 4, 1940.

William Robert Williams ● New York; College of Physicians and Surgeons, medical department of Columbia College, New York, 1895; instructor of materia medica and therapeutics at his alma mater from 1906 to 1908, assistant professor of pharmacology and therapeutics from 1908 to 1914 and associate professor of clinical medicine from 1914 to 1921; instructor in medicine, Cornell University Medical College, 1903-1904, and professor of clinical medicine since 1932; aged 73; served in various capacities and at various times on the staffs of the Horton Memorial Hospital, Middletown, and St. John's Riverside Hospital, Yonkers, French Hospital, New York Infirmary for Women and Children and the New York Hospital, where he died, Nov. 17, 1940.

Thomas Benjamin Carroll, Pittsburgh; Jefferson Medical College of Philadelphia, 1903; member of the Medical Society of the State of Pennsylvania; member of the American Gynecological Society; fellow of the American College of Surgeons; past president of the Allegheny County Medical Society; served during the World War; aged 67; on the staff of the Woman's Hospital, St. Francis Hospital and the Montefiore Hospital, Pittsburgh, and the Columbia Hospital, Wilkinsburg, where he died, Nov. 26, 1940.

Harry Michael Stein ● Baltimore; University of Maryland School of Medicine, Baltimore, 1914; professor of clinical medicine at his alma mater; served during the World War; aged 49; formerly superintendent of the University of Maryland Hospital, where he died, Nov. 15, 1940, of arterial hypertension, nephrosclerosis, diverticulosis of the colon and cholelithiasis.

Samuel Lynn Wadley, Palmer, Texas; University of Tennessee Medical Department, Nashville, 1905; member of the State Medical Association of Texas; for many years city health officer and member of the school board; past president of the Ellis County Medical Society; aged 59; died, Nov. 4, 1940, in the Dr. E. P. Becton's Hospital, Greenville, of pneumonia.

Augustus Leon Beier, Chippewa Falls, Wis.; Wisconsin College of Physicians and Surgeons, Milwaukee, 1907; member of the American Psychiatric Association; superintendent of the Northern Wisconsin Colony and Training School; aged 56; died, Nov. 13, 1940, in St. Mary's Hospital, Madison, of coronary thrombosis.

Edward Isadore Steinberg ● Erie, Pa.; Denver and Gross College of Medicine, 1907; member of the American Academy of Dermatology and Syphilology; aged 56; on the staffs of the Hamot Hospital and St. Vincent's Hospital; died, Nov. 10, 1940, of a respiratory tract infection and heart disease.

Charles Weseley Rice ● Northumberland, Pa.; Medico-Chirurgical College of Philadelphia, 1902; president and for many years a member of the school board; served during the World War; aged 62; on the staff of the Mary Packer Hospital, Sunbury, where he died, Nov. 24, 1940, of pneumonia.

Isadora Sharring Powers, Grand Rapids, Mich.; University of Michigan Homeopathic Medical School, Ann Arbor, 1894; formerly member of the board of education of Grandville; aged 79; died, Nov. 25, 1940, in the Blodgett Hospital of diverticulosis and hypostatic pneumonia.

Charles Jefferson Woods ● Macon, Ga.; Miami Medical College, Cincinnati, 1905; member of the American Academy of Dermatology and Syphilology; past president of the Tulsa County (Okla.) Medical Society; served during the World War; aged 60; died, Nov. 6, 1940.

Klor Lehman Parent, Lima, Ohio; Ohio State University College of Medicine, Columbus, 1913; member of the Ohio State Medical Association; on the staffs of the Lima Memorial Hospital and St. Rita's Hospital; aged 51; died, Nov. 20, 1940, of adenocarcinoma of the colon.

Frederick Thompson Wright, La Jolla, Calif.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1899; member of the Arizona State Medical Association; past president of the state board of medical examiners of Arizona; aged 75; died, Nov. 8, 1940.

David Middleton Lawson, Nowata, Okla.; Hospital College of Medicine, Louisville, Ky., 1899; served during the World War; for many years member of the board of education; aged 73; died, Nov. 23, 1940, of diabetes mellitus and chronic myocarditis.

Frank Chase Wade ● Howe, Ind.; Detroit College of Medicine, 1900; president of the Lagrange County Medical Society; for many years member of the school board; bank president; aged 63; died, Nov. 14, 1940, of arteriosclerosis with hypertension.

Reginald P. Humphreys, New Haven, Mich.; Wayne University College of Medicine, Detroit, 1938; member of the Michigan State Medical Society; aged 29; died, Nov. 21, 1940, in St. Joseph Hospital, Mount Clemens, of subacute bacterial endocarditis.

Harold Dale Strausbaugh, Columbus, Ohio; Starling-Ohio Medical College, Columbus, 1910; member of the Ohio State Medical Association; served during the World War; aged 52; died, Nov. 28, 1940, in the Mount Carmel Hospital of coronary occlusion.

Thomas William Murphy, Lawrence, Mass.; Tufts College Medical School, Boston, 1904; member of the Massachusetts Medical Society; aged 70; on the staff of the Lawrence General Hospital, where he died, Nov. 2, 1940, of angina pectoris.

Hugh Parks ● Elkin, N. C.; Jefferson Medical College of Philadelphia, 1921; aged 44; on the staff of the Hugh Chatham Memorial Hospital, where he died in November 1940 of hypertensive cardiovascular disease and coronary occlusion.

Porter Prather, Lexington, Ky.; Medical College of Ohio, Cincinnati, 1886; member of the Kentucky State Medical Association; aged 81; died, Nov. 28, 1940, in the Good Samaritan Hospital of a fractured pelvis received in a fall.

Herbert Clark Waddle, Janesville, Wis.; College of Physicians and Surgeons of Chicago, School of Medicine of the University of Illinois, 1903; aged 73; died, Nov. 9, 1940, in the Wisconsin General Hospital, Madison.

John L. Stillings, Yakima, Wash.; University of Louisville (Ky.) Medical Department, 1893; served during the World War; aged 71; died, Nov. 6, 1940, in the Veterans Administration Facility, Walla Walla.

Benjamin Robert McGrath ● Grand Island, Neb.; University of Illinois College of Medicine, Chicago, 1902; served during the World War; aged 67; died, Nov. 18, 1940, of cerebral thrombosis.

Charles Elmore Trimble ● Crestline, Ohio; Starling Medical College, Columbus, 1890; past president of the Crawford County Medical Society; aged 77; died, Nov. 26, 1940, of heart disease.

Frank Guillard, Saxton, Pa.; Medico-Chirurgical College of Philadelphia, 1914; served during the World War; aged 50; died, Nov. 19, 1940, in the J. C. Blair Memorial Hospital, Huntingdon.

Frederick William Veninga ● St. Louis; American Medical College, St. Louis, 1906; aged 66; on the staff of the Lutheran Hospital, where he died, Nov. 10, 1940, of chronic myocarditis.

Charles Materazzi, Paterson, N. J.; Regia Università di Napoli Facoltà di Medicina e Chirurgia, Italy, 1911; aged 54; died, Nov. 14, 1940, in Perdisumo, Cilento, Italy, of influenza.

Thomas Ellsworth Schrider, Bryan, Ohio; Long Island College Hospital, Brooklyn, 1889; aged 78; died, Nov. 23, 1940, in St. Vincent's Hospital, Toledo, of obstructive jaundice.

William Henry H. Barker, Harvey, Iowa; Harvey Medical College, Chicago, 1898; Civil War veteran; also a dentist; aged 100; died, Nov. 8, 1940, of chronic myocarditis.

Ronald Robertson Smith, Tulsa, Okla.; University of Kansas School of Medicine, Kansas City, 1906; aged 56; was found dead in bed in November 1940 of heart disease.

Adolph Otto Sistler ● Hoopeston, Ill.; University of Louisville (Ky.) Medical Department, 1910; aged 57; died in November 1940 of myocarditis.

Frank Renel Lord, Covington, Ky.; Miami Medical College, Cincinnati, 1894; aged 68; died, Nov. 26, 1940, of cerebral edema.

Bureau of Investigation

MISBRANDED "PATENT MEDICINES"

Abstracts of Notices of Judgment Issued by the Food and Drug Administration of the United States Department of Agriculture

[Editorial Note.—The abstracts that follow are given in the briefest possible form: (1) the name of the product; (2) the name of the manufacturer, shipper or consigner; (3) the composition; (4) the type of nostrum; (5) the reason for the charge of misbranding and (6) the date of issuance of the Notice of Judgment—which is considerably later than the date of the seizure of the product and somewhat later than the conclusion of the case by the Food and Drug Administration.]

Acid Eliminating Powder.—Ray Alma Richardson, Helen Richardson (Mrs. R. A. Richardson) and Myra Deane Richardson, trading as the Myra Deane Co., Kansas City, Mo. Composition: essentially baking soda, sodium carbonate, chalk, magnesium oxide and peppermint. Misbranded because of its misleading name, since the article was not an acid eliminant as so understood; misbranded further because fraudulently represented to eliminate indigestion, avert or correct active or passive liver congestion, prevent abscess or cirrhosis of the liver, remedy female weaknesses, sexual frigidity, hay fever or asthma, correct constipation, hives, acidosis or skin eruptions, and prevent rheumatism, arthritis, mental depression or congestion of the heart and gallbladder.—[*N. J. 30964; August 1940.*]

Agalax.—Associated Laboratories, Inc., and the Agalax Company, New York. Composition: essentially psyllium seed and small brown masses containing sugar, starch, dextrin and phenolphthalein (0.13 grain per teaspoonful). Misbranded because represented to be a food and to contain no drug or medicine, whereas it did contain phenolphthalein, a coal tar drug; further misbranded because fraudulently represented as a cure for chronic constipation, autointoxication and allied conditions, and as a relief for hemorrhoids and painful defecation.—[*N. J. 30960; August 1940.*]

Chippewa Genuine Guaranteed Old Indian Medicine.—Lucky Heart Laboratories, Inc., Memphis, Tenn. Composition: essentially epsom salt, plant drugs including a laxative (licorice) and water colored with caramel. Falsely represented to consist entirely of substances from roots, herbs and berries. Fraudulently represented to be effective as a general tonic and as a cure for tired feeling, nervousness and indigestion, sour stomach, torpid liver, impure blood and some other things.—[*N. J. 30965; August 1940.*]

Chippewa Indian Herbs Tea.—Lucky Heart Laboratories, Inc., Memphis, Tenn. Composition: essentially plant material including juniper berries, fennel seed, licorice root, anise seed, unidentified flower petals and a woody material. For upset stomach, biliousness, headaches, bad complexion, rundown health, dyspepsia, impure blood and liver and kidney disorders. Fraudulent therapeutic claims.—[*N. J. 30965; August 1940.*]

Classen Health Yeast.—National Yeast Co., Inc., Findlay, Ohio. Composition: less than 2 International Units of vitamin B_1 not more than 50 U. S. P. units of vitamin A and approximately 10 U. S. P. units of vitamin D per gram; also ground corn and corn starch, wheat tissues (bran), embryo tissues (germ) apparently from cereals, yeast cells, crystalline dextrose hydrate (corn sugar), crystalline sucrose (sugar) and a trace of hop tissues. Fraudulently represented as a health yeast conducive to a clear skin; as a cure for indigestion, acid stomach, bad breath, hemorrhoids, skin blemishes, diarrhea, stunted growth, loss of weight and appetite, anemia, diabetes, tuberculosis and some other things; contained ingredients other than yeast and was not so represented.—[*N. J. 30975; August 1940.*]

Coal Breaker Pills.—Lucky Heart Laboratories, Inc., Memphis, Tenn. Composition: acetanilid (0.93 grain per pill), extracts of plant drugs including capsicum and a laxative, small proportions of camphor, a quinine and an iron compound, chalk and talc. For biliousness, dizziness, sour stomach, gas, colic and "infection." Misbranded because of fraudulent therapeutic claims and label statement "Contains bromides," whereas government chemists reported finding none; further misbranded in containing acetanilid not declared on the label.—[*N. J. 30965; August 1940.*]

Erbro Pine Compound Cough Syrup.—Lucky Heart Laboratories, Inc., Memphis, Tenn. Composition: essentially extracts of plant drugs, including white pine, with chloroform (6 minims per fluid ounce), sugar and water, colored with caramel. Misbranded because presence and amount of chloroform not declared on label.—[*N. J. 30965; August 1940.*]

Formula No. DP 64 Duodenin and Pancreas Substance Tablets.—Ray Alma Richardson, Helen Richardson (Mrs. R. A. Richardson) and Myra Deane Richardson, trading as the Myra Deane Co., Kansas City, Mo. Composition: considerable amount of animal tissues, apparently glandular in nature, and crystalline milk sugar. Misbranded because label statement "Contains Duodenin and Pancreas Substance" falsely represented that the product contained duodenin and pancreas and was active and effective because these substances were present, whereas the product consisted of inert animal material resembling glandular substance, and milk sugar; further misbranded because the claim "Useful in Diabetes Mellitus" fraudulently represented the article as being medicinally effective in treating that condition, which it was not.—[*N. J. 30964; August 1940.*]

Formula No. FH 60 Endocrine Compound Female.—Ray Alma Richardson, Helen Richardson (Mrs. R. A. Richardson) and Myra Deane Richardson, trading as the Myra Deane Co., Kansas City, Mo. Composition: compressed tablets composed essentially of milk sugar and animal protein matter resembling glandular substances. Misbranded because feeding tests on animals showed the product inert in doses of one or two tablets per animal; further misbranded because fraudulently represented as a remedy for organs whose functions are related to and affect the female menstrual cycle.—[*N. J. 30964; August 1940.*]

Formula No. FH 60 Endocrine Cycle Food Female.—Ray Alma Richardson, Helen Richardson (Mrs. R. A. Richardson) and Myra Deane Richardson, trading as the Myra Deane Co., Kansas City, Mo. Composition: compressed tablets composed essentially of milk sugar and animal protein matter resembling glandular substances. Misbranded because statements on label "Contains interrelated gland substances of the female endocrine cycle" and "Endocrine Cycle Food Female" falsely represented that the ingredients were active gland substances and that the product was capable of producing an enzymic action, whereas it consisted of inert animal matter resembling glandular substance and milk sugar and could not produce enzymic action; further misbranded because fraudulently represented as a remedy for organs whose functions are related to and affect the feminine menstrual cycle; and as being effective in restoring health, vitality or "pep," correcting overweight or underweight, toxic goiter, fibroid tumor and some other things.—[*N. J. 30964; August 1940.*]

Formula No. HBP 60 For Controlling High Blood Pressure.—Ray Alma Richardson, Helen Richardson (Mrs. R. A. Richardson) and Myra Deane Richardson, trading as the Myra Deane Co., Kansas City, Mo. Composition: compressed tablets essentially containing glandular material including 0.09 Gm. of thyroid per tablet. Misbranded because falsely labeled "No Drugs," whereas it contained thyroid and other glandular material; further misbranded because the statements "for controlling high blood pressure" and "contains pancreas and thyroid substances in balanced combination to aid in controlling high blood pressure" were false and fraudulent, since the product was inert.—[*N. J. 30964; August 1940.*]

Formula No. RS 63.—Ray Alma Richardson, Helen Richardson (Mrs. R. A. Richardson) and Myra Deane Richardson, trading as the Myra Deane Co., Kansas City, Mo. Composition: a considerable amount of animal tissue, apparently glandular in nature, and crystalline milk sugar with finely ground bone. Misbranded because falsely labeled "Rich in calcium salts and iron," whereas each tablet contained not more than 0.28 grain (0.018 gram) of combined calcium and not more than 0.0027 grain (0.00017 gram) of combined iron; further misbranded because falsely and fraudulently represented as being effective in the treatment of secondary anemia, whereas it was not.—[*N. J. 30964; August 1940.*]

Hain Col-Lax.—Hain Pure Food Co., Los Angeles. Composition: ground psyllium, agar and milk sugar. Fraudulently represented as a noncathartic safe to use in colitis, ulceration and hemorrhoids.—[*N. J. 30954; August 1940.*]

Hain Kelp Tablets.—Hain Pure Food Co., Los Angeles. Composition: powdered kelp. Fraudulently represented as a cure for glandular deficiencies, nervous debility, mental exhaustion and general rundown conditions.—[*N. J. 30954; August 1940.*]

Oralsulin.—Lafayette Pharmacal, Inc., Lafayette, Ind. Composition: essentially powdered animal tissues, including a small amount of an enzyme such as found in pancreas tissue; one sample contained starch and another powdered ginger. Biologic tests showed no evidence of insulin activity following oral administration. Adulterated because far below strength, quality or purity of professed standard and quality and because falsely represented to consist of "Enterocap Oralsulin," namely, insulin or similar substance intended for oral administration. Misbranded because represented on label to be an oral substitute for insulin injections and fraudulently represented as an effective treatment for diabetes mellitus.—[*N. J. 30998; August 1940.*]

Orono Hygiene Soap.—Lucky Heart Laboratories, Inc., Memphis, Tenn. Composition: a sodium soap, colored and perfumed. Recommended for use in connection with "Heal-O-Salve" to relieve discomfort and varieties of open sores, irritated skin and similar disorders. Fraudulent therapeutic claims including that of "antiseptic."—[*N. J. 30965; August 1940.*]

Pisip.—Merit Laboratories Co., Philadelphia. Composition: not given. Adulterated because it approximately contained only 250 U. S. P. units of vitamin D instead of the 1,000 units claimed on the label.—[*N. J. 30963; August 1940.*]

Pisip Laxative Cold Capsules.—Merit Laboratories, Philadelphia. Composition: one specimen, a minimum of 3.03 grains of acetophenetidin, 1.30 grains of acetanilid and about 20 units of vitamin C. Misbranded because the presence and amount of acetophenetidin, a derivative of acetanilid, were not declared on the label; further misbranded and falsely labeled because declared that the acetanilid content of each capsule was only 1 grain, whereas it was not less than 1.3 grains; misbranded further because fraudulently represented to lessen the acidity of the body and facilitate the absorption of the active vitamin principles of citrus fruits.—[*N. J. 30963; August 1940.*]

Saurisol.—Saurinol Distributors, Colorado Springs, Colo. Composition: medium boiling petroleum oil with a small proportion of quinine alkaloid. Fraudulently represented as a cure for exposed cancer, pyorrhea, varicose veins, trench mouth, sinus trouble, hay fever, lacerations, ulcers and skin diseases.—[*N. J. 30953; August 1940.*] The Saurinol business was declared fraudulent and debarred from the mails in February 1940 as reported in The Journal, Sept. 21, 1940, page 1037.

Sears's Re-Lef.—Snare Bros. Ointment Co., Chillicothe, Mo. Composition: essentially volatile oils including mustard, wintergreen, menthol and a camphoraceous one, in a petrolatum base. Fraudulently represented as a cure for pneumonia and an effective treatment for sinus trouble, asthma, rheumatism, hemorrhoids, appendicitis, open sores, pleurisy and some other things.—[*N. J. 30957; August 1940.*]

X-Ode.—X-Products Co., St. Paul. Composition: sodium carbonate (99.15 per cent) and potassium permanganate (0.85 per cent). Falsely and fraudulently represented as efficacious for treating skin infections.—[*N. J. 30959; August 1940.*]

Correspondence

LECTURES ON MEDICAL ECONOMICS

To the Editor:—In connection with your editorial comment on "Teaching of Social Medicine" in THE JOURNAL, Dec. 7, 1940, page 2001, it may interest you to know that in each of the last three years the speakers' bureau of the Committee on Public Relations of the Philadelphia County Medical Society has furnished six lecturers on socialized medicine for the classes in economics in the various schools of the University of Pennsylvania.

MYER SOLIS-COHEN, M.D., Philadelphia.
Chairman, Committee on Public Relations.

MEDICAL DICTION AND TERMINOLOGY

To the Editor:—Twice today I have had telephone calls, from independent sources, stating that "a complete g-i examination" was desired. On cross examination—which should not be necessary but which I can testify is—it was revealed that an examination of only the stomach was desired.

How much wasted effort and often expense would be saved if physicians could get together on terminology! To a roentgenologist g means gastro and i means intestinal, and any referring physician who gets on a high horse to my secretary when she tries to find out whether "a complete g-i examination" means a stomach and colon, a stomach and small intestine and colon or only a stomach is in a vulnerable position, as people always are who ride on high horses. If the terminology used by many physicians of my acquaintance reflects their schoolday teaching, the teaching has been sloppy.

Another thing that annoys me is for physicians to request a "g-u examination." G stands for genital and u for urinary, at least to me, and there is seldom any occasion to examine a man's genital apparatus when the point at issue is a stone in his urinary apparatus. In fact, I have gone to considerable pains to try to educate some of the profession that any irradiation of the germ plasm of any person who is not past the reproductive period—and who can say, in the case of a male, when a patient is past any possibility of reproducing his kind?—is fraught with dire consequences to future generations unless the human germ plasm reacts differently from the germ plasm of the twenty-nine genera of other animals that have been studied to date.

Another daily request that reflects a total lack of comprehension of semantics is to ask for a "flat plate." A plate is made of glass, and I never saw one yet devoted to roentgenographic purposes that was not flat. Glass plates went out not long after bustles did; today films are used, and they are just as flat as glass plates ever were, unless one wants to lay emphasis on the curved casette that had a vogue a few years ago; even the product of this gadget was flat when it was put up for inspection. To ask for a flat plate when a film is meant, or even to ask for a flat film, is like asking for an egg omelet. I think that what is meant is a single film as opposed to a stereoscopic pair; at least the context practically always leads to that conclusion. It doesn't mean that it is desired to have the patient flat on the table, because I am frequently asked for a "flat plate upright" when the question is the determination of the presence of air under the right diaphragm in a case of suspected perforated ulcer.

As I get older, I look back with even more sympathy than I had at the time on my erstwhile professor of surgery Charles L. Gibson, who invariably interrupted the student who mentioned "lymph glands" with "please don't say lymph glands in my clinic," and would explain that glands are epithelial structures with a secretion, which lymph nodes quite definitely are not. One can search the whole world over but will never find a Cornell graduate of Gibson's time who will say "lymph glands." However, the misuse of the term is so well nigh universal that if a man says "lymph nodes" one can bet with reasonable safety that he was once a student of Gibson's.

To go out of my own field, which I was never averse to do, I should like to pay my respects to the persons who can spare no longer designation for the wares of the string galvanometer than "E. K. G." To ask for an elektrokardiogramm by the initials of its component German words is to pay homage to a language which at the moment is not identified with scientific freedom. If Einthoven could go to the trouble to invent the string galvanometer, I think people should go to the trouble to pronounce "electrocardiogram." I'm not saying that I think they will; I'm just saying that I think they should.

The late Dr. E. W. Caldwell used to say that roentgenology would be an enjoyable occupation if it weren't for the patients. I will modify that to say that roentgenology wouldn't be so bad if physicians would only tell the roentgenologist what they mean. There used to be a song upward of thirty years ago—if I recall correctly, it was in a show of Raymond Hitchcock's—that went

> If people said the things they mean
> And meant the things they say.

It's still good.

RAMSAY SPILLMAN, M.D., New York.

AN ACUTE PUBLIC HEALTH PROBLEM OF IMMIGRATION

To the Editor:—Even in normal times, port cities are confronted with health problems of unique character. San Francisco always has had certain definite health problems with regard to travelers coming from the Orient. Recently, however, a new angle has developed. Early in 1940 roentgen examinations of the positive reactors to tuberculin in the routine testing done in San Francisco schools showed an unusually large number of Chinese boys in junior high school with far advanced clinical tuberculosis.

For a period of ten years past, high school and junior high school students in this city have received tuberculin tests every year. The tests done are an intracutaneous Mantoux of 1:1,000 dilution. Roentgenograms of the positive reactors are made and the negative reactors are retested at regular intervals throughout their school life. The incidence of clinical tuberculosis and the mortality are considerably higher in the Chinese population than for the rest of the city.

During the first three months of 1940, 26 Chinese children were removed from school because of clinically active tuberculosis. They all had far advanced tuberculosis; one had bilateral cavitation and none of the cases looked recent. Twelve additional patients are under observation. Many were found to have spent varying lengths of time in China. Of the 26, 5 were girls and 21 were boys or, rather, young men, since they are all much older than the usual junior high school age. The 12 under observation are all boys. The ages of these students is an important factor. These ranged between 16 and 23 years; the average junior high school age in San Francisco is 12 or 13 years.

An investigation revealed that many of these boys had been recently admitted to the United States as American citizens or as children of American citizens without any kind of a physical examination. All had been visitors to a district in or near Canton, China, where their time of residence varied from life to ten years. The length of time after return to the United States varied from four months to two years. It is evident that there has been in 1940 in San Francisco a decided increase in the number of clinically active cases of tuberculosis among Chinese boys of the junior high school grades.

Investigation has shown that Chinese have taken their sons with them to China. The boys have lived in the vicinity of

Canton, China, under adverse public health conditions not found in the United States, and more recently under actual war conditions. Whenever possible, Chinese have returned their sons to the safety of the United States. The boys are American citizens who are classified merely as having been away on a vacation, or in other cases they are the children of American born Chinese born in China. In this situation lies a menace of tuberculosis, especially to the Chinese population of San Francisco. It would seem desirable to have a roentgenogram of the chest of all young Chinese returning to the United States after a prolonged sojourn in China.

This is merely one age and one race group. The cost to San Francisco in three months alone for the care of these Chinese youths with active tuberculosis and the probable necessity of shortly caring for additional cases would justify taking every precaution at the port of debarkation by proper federal authorities in order to limit further the spread of tuberculosis in the United States.

J. C. GEIGER, M.D.
ETHEL OWEN, M.D.
Department of Public Health, San Francisco.

Medical Examinations and Licensure

COMING EXAMINATIONS

BOARDS OF MEDICAL EXAMINERS

ALABAMA: Montgomery, June 17-19. Sec., Dr. J. N. Baker, 519 Dexter Ave., Montgomery.

ARKANSAS: * *Medical.* Little Rock, June 5-6. Sec., Dr. D. L. Owens, Harrison. *Eclectic.* Little Rock, June 5-6. Sec., Dr. Clarence H. Young, 1415 Main St., Little Rock.

CALIFORNIA: *Oral examination* (required when reciprocity application is based on a state certificate or license issued ten or more years before filing application in California), Los Angeles, Jan 29. *Written,* Los Angeles, Feb. 24-27. Sec., Dr. Charles B. Pinkham, 1020 N St., Sacramento.

CONNECTICUT: * *Medical. Written.* Hartford, March 11-12. *Endorsement.* Hartford, March 25. Sec., Dr. Thomas F. Murdock, 147 W. Main St., Meriden. *Homeopathic.* Derby, March 11-12. Sec., Dr. Joseph H. Evans, 1488 Chapel St., New Haven.

DELAWARE: July 8-10. Sec., Medical Council of Delaware, Dr. Joseph S. McDaniel, 229 S. State St., Dover.

DISTRICT OF COLUMBIA: * Washington, May 12-13. Sec., Commission on Licensure, Dr. George C. Ruhland, 203 District Bldg., Washington.

FLORIDA: * Jacksonville, June 23-24. Sec., Dr. William M. Rowlett, Box 786, Tampa.

GEORGIA: Atlanta, June. Sec., State Examining Boards, Mr. R. C. Coleman, 111 State Capitol, Atlanta.

IDAHO: Boise, April 1. Dir., Bureau of Occupational License, Mr. H. B. Whittlesey, 335 State Capitol Bldg., Boise.

ILLINOIS: *Written.* Chicago, Jan. 21-22. *Reciprocity.* Chicago, Jan. 23. Supt. of Registration, Dept. of Registration and Education, Mr. Lucien A. File, Springfield.

INDIANA: Indianapolis, June 17-19. Sec., Board of Medical Registration and Examination, Dr. J. W. Bowers, Citizens Trust Bldg., Fort Wayne.

KANSAS: Kansas City, June 17-18. Sec., Board of Medical Registration and Examination, Dr. J. F. Hassig, 905 N. 7th St., Kansas City.

MAINE: Portland, March 11-12. Sec., Board of Registration of Medicine, Dr. Adam P. Leighton, 192 State St., Portland.

MARYLAND: *Medical.* Baltimore, June 17-20. Sec., Dr. John T. O'Mara, 1215 Cathedral St., Baltimore. *Homeopathic.* Baltimore, June 17-18. Sec., Dr. John A. Evans, 612 W. 40th St., Baltimore.

MASSACHUSETTS: Boston, March 11-13. Sec., Board of Registration in Medicine, Dr. Stephen Rushmore, 413-F State House, Boston.

MICHIGAN: * Ann Arbor and Detroit, June 11-13. Sec., Board of Registration in Medicine, Dr. J. Earl McIntyre, 202-4 Hollister Bldg., Lansing.

MINNESOTA: * Minneapolis, Jan. 21-23. Sec., Dr. Julian F. Du Bois, 350 St. Peter St., St. Paul.

MISSISSIPPI: Jackson, June. Asst. Sec., State Board of Health, Dr. R. N. Whitfield, Jackson.

MONTANA: *Reciprocity.* Helena, March 31. *Written.* Helena, April 1. Sec., Dr. S. A. Cooney, 216 Power Block, Helena.

NEVADA: *Reciprocity with oral examination,* Feb. 3. Sec., Dr. Fred M. Anderson, 215 N. Carson St., Carson City.

NEW HAMPSHIRE: Concord, March 13-14. Sec., Board of Registration in Medicine, Dr. T. P. Burroughs, State House, Concord.

NEW JERSEY: Trenton, June 17-18. Sec., Dr. Earl S. Hallinger, 28 W. State St., Trenton.

NEW MEXICO: Santa Fe, April 14-15. Sec., Dr. Le Grand Ward, 135 Sena Plaza, Santa Fe.

NEW YORK: Albany, Buffalo, New York and Syracuse, Jan. 27-30. Chief, Bureau of Professional Examinations, Mr. Herbert J. Hamilton, State Education Department, 315 Education Bldg., Albany.

SOUTH DAKOTA: * Pierre, Jan. 21-22. Dir., Medical Licensure, Dr. J. F. D. Cook, Pierre.

VERMONT: Burlington, Feb. 11. Sec., Dr. W. Scott Nay, Underhill.

WEST VIRGINIA: Charleston, March 3. Sec., Public Health Council, Dr. Arthur E. McClue, State Capitol, Charleston.

WYOMING: Cheyenne, Feb. 3-4. Sec., Dr. M. C. Keith, Capitol Bldg., Cheyenne.

* Basic Science Certificate required.

BOARDS OF EXAMINERS IN THE BASIC SCIENCES

ARIZONA: Tucson, March 18. Sec., Mr. Franklin E. Roach, Science Hall, University of Arizona, Tucson.

COLORADO: March 6-7. Sec., Dr. Esther B. Starks, 1459 Ogden St., Denver.

CONNECTICUT: Feb. 8. Address State Board of Healing Arts, 1945 Yale Station, New Haven.

DISTRICT OF COLUMBIA: Washington, April 21-22. Sec., Commission on Licensure, Dr. George C. Ruhland, 203 District Bldg., Washington.

FLORIDA: De Land, June 7. *Applications must be on file not later than May 24.* Sec., Prof. J. F. Conn, John B. Stetson University, De Land.

MICHIGAN: Ann Arbor, Detroit and East Lansing, Feb. 14-15. Sec., Miss Flora E. Dube, East Lansing.

OREGON: Portland, Feb. 15. Sec., State Board of Higher Education, Mr. Charles D. Byrne, University of Oregon, Eugene.

RHODE ISLAND: Providence, Feb. 19. Sec., Division of Examiners, Rev. Nicholas H. Serror, Providence College, Providence.

WISCONSIN: Madison, April 5. Sec., Prof. Robert N. Bauer, 3414 W. Wisconsin Avenue, Milwaukee.

Colorado October Report

Dr. Harvey W. Snyder, secretary, Colorado State Board of Medical Examiners, reports the written examination for medical licensure held at Denver, Oct. 2-4, 1940. The examination covered 8 subjects and included 69 questions. An average of 75 per cent was required to pass. Seven candidates were examined, 6 of whom passed and 1 failed. Two physicians were licensed to practice medicine by reciprocity and 1 physician so licensed by endorsement. The following schools were represented:

PASSED	Year Grad.	Per Cent
University of Colorado School of Medicine	(1938)	84.5
University of Chicago, The School of Medicine	(1940)	85
Tulane University of Louisiana School of Medicine	(1940)	86.5
Harvard Medical School	(1939)	84
Osteopaths *		80, 80

FAILED	Year Grad.	Number Failed
Osteopath*		1

LICENSED BY RECIPROCITY	Year Grad.	Reciprocity with
Northwestern University Medical School	(1939)	Illinois
University of Oklahoma School of Medicine	(1935)	Oklahoma

LICENSED BY ENDORSEMENT	Year Grad.	Endorsement of
College of Medical Evangelists	(1940)	N. B. M. Ex.

* Examined in medicine and surgery.

Miscellany

CHILD HEALTH AND MATERNAL CARE

Report and Recommendations of Subcommittees Submitted to Maternal and Child Health Advisory Committee Meeting at the Children's Bureau, Adopted by the Full Committee

The following reports were submitted to the Children's Bureau Maternal and Child Health Advisory Committee by the subcommittees on child health and maternal care and, after discussion, were adopted unanimously on December 3 by the full committee:

REPORT OF THE SUBCOMMITTEE ON CHILD HEALTH

The national defense program has caused a rapid increase in population in villages, towns and cities adjacent to military cantonments and in those with rapidly expanding defense industries. Such expansion of population brings with it urgent problems of health protection for the whole populace, but especially for children and pregnant women in the families of workers and enlisted men.

The committee recognizes that these concentrations of population have come about for purposes related to the whole of the population of the United States, not merely the areas in which they occur. The problems arising from them are the concern of the whole of the United States, and the failure to meet them is a potential adverse influence on the whole country.

In view of this emergency, the advisory subcommittee on child health of the Children's Bureau has given careful consideration to the urgency of providing facilities to meet existing conditions —bad housing, crowding of households, inadequate provision for recreation, bad sanitary facilities, inadequate control of communicable diseases, and lack of health supervision and medical care for mothers and children.

The committee recognizes the progress that has been made under the maternal and child health program in establishing state and local services for mothers and children. There must be no interruption in the development of this long-range program. The committee is also cognizant of the fact that large gaps in this program still exist which must be closed if anything approaching an adequate program is to be put into effect.

Because of the greatly intensified and additional problems created by national defense, however, the need for immediate expansion of these services is even more urgent than was previously apparent. The experience gained in the last few years has made it possible to outline clearly the ways in which this emergency may be met. Two obstacles present themselves, however: lack of funds and deficiency of trained personnel.

The advisory subcommittee on child health therefore recommends:

1. That increased resources be made available to the Children's Bureau to enable it—

(a) to hasten the development of an adequate maternal and child health program commensurate with existing needs for health services and medical care through substantially increased grants-in-aid to states under title V of the Social Security Act;

(b) to make careful investigations of the health, medical, housing and recreation facilities available to wives and children of workers living in or near the defense industry areas and of enlisted men in communities near military cantonments, and to provide facilities and services to meet the health and medical needs as they are found to exist; and

(c) to plan for the protection of mothers and children in any other emergency situation arising from national defense. We refer here to the immediate making of appropriate plans for the protection of mothers and children in areas of military danger and for their evacuation and placement in selected reception areas.

2. That, in view of the known insufficiency of personnel for the care of mothers and children, the Selective Service Board, the local draft boards and the military services be urgently requested, in calling physicians for military duty, to give as much consideration as possible to retaining in the local communities those physicians who are responsible, in the fields of public health and medical practice, for maternal and child care.

The advisory subcommittee on child health further recommends:

1. That, in view of the necessity for recognition by the National Defense Council of the needs of mothers and children in the civilian population, the Children's Bureau be given representation in the Health and Medical Committee of the National Defense Council;

2. That the resolution of the Academy of Pediatrics calling for the appointment of a pediatrician to the Health and Medical Committee be endorsed; and

3. That the chairman of the Maternal and Child Health Advisory Committee transmit these recommendations to the Secretary of Labor and seek an appointment with the President of the United States to lay before him the recommendations of the committee and to discuss the urgent need to safeguard the health and welfare of mothers and children as part of the national defense program.

REPORT OF THE SUBCOMMITTEE ON MATERNAL CARE

The committee recognizes that the great improvement in maternal and infant care which has resulted from the leadership and efforts of the medical profession are not uniform throughout the country. It is our belief that in many areas of the United States, especially where maternal and infant death rates are highest, there is urgent need for providing medical and hospital care for maternity patients and newborn infants who cannot now obtain this care. New and urgent situations have been and are being created by the concentration of families in areas where defense programs are being developed. Plans must be made immediately to provide the mothers and children in these areas with needed health services.

It is recognized that the need for better maternal and child care is intimately connected with other economic and medical deficiencies and that a truly effective program must have broad objectives and must be developed in cooperation with other governmental agencies.

In the opinion of the committee the problem of medical and hospital care for mothers and infants in many of the areas of greatest need would be solved by extending the use of existing facilities and by constructing and maintaining new hospitals where needed for the care of maternity patients and newborn infants with adequate safeguards to protect the quality of service in these institutions.

The committee recommends that additional funds be appropriated under title V of the Social Security Act to assist the state and local health agencies in meeting the health needs of mothers and children, both by extending the use of existing facilities and by establishing and maintaining hospitals for the care of mothers and newborn infants where needed.

Since the evacuation of mothers and infants from densely populated areas is an ultimate possibility, it is further recommended that plans be considered for transporting such persons to safe areas and for providing the medical and hospital services which may be needed.

Bureau of Legal Medicine and Legislation

MEDICOLEGAL ABSTRACTS

Osteopathy: Right of Practitioner to Practice Optometry.—Mabry, who was not licensed to practice medicine, optometry or any other form of the healing art, sold eyeglasses or spectacles in Atlanta, Ga., purportedly as a dispensing optician. He employed on a full time salary basis Turner, who possessed only a license to practice osteopathy in Georgia. Turner examined the eyes of such persons as were sent to him by Mabry or might otherwise come to him and, if the examinations indicated the necessity for eyeglasses, wrote prescriptions for lenses to be filled by Mabry. Mabry in turn took measurements to ascertain the necessary width of the frame and the size of the glasses and had the lenses ground according to Turner's prescription by a New York manufacturer, which also made the frames. The manufacturer sent the eyeglasses to Mabry, Turner checked the lenses against the prescription and delivered the glasses to the patient. The price that the patient paid to Mabry embraced the cost of the materials and a charge for the examination and prescription. The Georgia state board of examiners in optometry and its individual members, alleging that the acts of Mabry and Turner constituted the practice of optometry, that neither of them was licensed or otherwise entitled so to practice and that their acts constituted a menace and nuisance dangerous to the public health and safety, filed a bill to restrain Mabry and Turner from carrying on the activities referred to. The trial court issued a temporary injunction and Mabry and Turner appealed to the Supreme Court of Georgia.

Apparently the appellants assumed that the legality of the activities of both of them turned on whether or not Turner by virtue of his license to practice osteopathy could practice optometry. They contended that Turner could legally practice optometry without obtaining a license under the Georgia optometry practice act because (1) the optometry act, by its very terms, was not applicable to a licensed osteopath, a section of the act (Ga. Code, Sec. 84-1108) specifically providing that "Nothing in this Chapter shall be construed to apply to physicians and surgeons duly licensed to practice medicine," and (2) the Georgia osteopathic practice act authorizes its licentiates to practice osteopathy "as taught and practiced in legally incorporated and reputable colleges of osteopathy" (Sec. 84-1209) and Turner in the osteopathic school which he attended was taught "ophthalmology, which includes measurement of power of vision and adaptation of lenses to correct faulty or defective sight."

The appellants' first contention, said the Supreme Court, that Turner is exempted from the provisions of the optometry act because it exempts physicians and surgeons duly licensed to practice medicine, turns on whether or not Turner is, within the meaning of that act, a physician and surgeon duly licensed to practice medicine. The osteopathic practice act, under which Turner was licensed, authorizes its licentiates to practice osteopathy "as taught and practiced in legally incorporated and reputable colleges of osteopathy." Unfortunately for the courts, in enacting the osteopathic practice act in 1909, the legislature did not define "osteopathy" but left the meaning to be determined by how osteopathy was taught and practiced in reputable colleges of osteopathy. In construing a similar statute in Kansas, the tenth circuit court of appeals, in *Burke* v. *Kansas State Osteopathic Association*, 111 F. (2d) 250, 256, reached the conclusion that

the fact that in an osteopathic college the broad principles of medicine and surgery were investigated and considered, merely for the purpose of giving the student body a knowledge of what those who practice medicine and surgery believe, would not be sufficient to conclude that those licensed to practice osteopathy would have the right to practice medicine or surgery.

In construing an exception in the New Jersey optometry practice act similar to that contained in the Georgia act, the supreme court of New Jersey in *State* v. *Watters*, 143 A. 749, held that a licensed osteopath cannot practice optometry because he is

not in the category of a licensed physician who may practice medicine and surgery. The term osteopathy, the Georgia court continued, is defined in 46 C. J. 1142 as follows:

> A modern system or science of treating human diseases by kneading and rubbing the body; a method of treating diseases of the human body without the use of drugs, by means of manipulations applied to various nerve centers, chiefly those along the spine, with a view to inducing free circulation of blood and lymph, and an equal distribution of the nerve forces.

Bouvier's Law Dictionary (Student's Ed., p. 881) defines osteopathy as

> a method of treating diseases by kneading or manipulation of the body, and does not teach surgery, bacteriology, materia medica, or therapeutics.

The term is likewise defined by Webster's New International Dictionary as

> A system of treatment based on the theory that diseases are chiefly due to deranged mechanism of the bones, nerves, blood vessels, and other tissues, and can be remedied by manipulations of these parts.

From these definitions, said the court, it is apparent that "osteopathy is based on the theory that human ailments result from disarrangement or misplacement of bones, nerves, and blood vessels, and that the cure for the ailment is the correction of such misplacement, thereby giving nature an opportunity to heal." It follows that in a reputable college of osteopathy, as referred to by the Georgia statute, the course of study taught and practiced must conform to these authoritative definitions. Any course taught or practiced which is outside the true scope of osteopathy cannot be brought within its scope merely because it is given by an osteopathic college. The Georgia osteopathic practice act, properly construed, authorizes the licentiate thereunder to practice osteopathy, and that only as taught by reputable colleges.

We now turn, continued the court, to a consideration of the language "physicians and surgeons duly licensed to practice medicine." A license to practice medicine can be issued in Georgia only by the state board of medical examiners. Consequently a license issued by the osteopathic board, regardless of what such license purports to authorize, does not and cannot authorize the "practice of medicine" as that term is defined in the only statute in this state defining the practice of medicine, the medical practice act. A provision in the medical practice act, declaring that nothing therein shall be construed to prohibit "the practice of . . . . osteopaths not prescribing medicines or administering drugs" (Ga. Code, Sec. 84-906), permits an osteopath to practice osteopathy without procuring a license to practice medicine, provided he does not prescribe medicine or administer drugs. This exemption, however, does not enable an osteopath to prescribe medicine, whether that medicine be a drug or otherwise; and at this point the question arises whether lenses for the relief of eye trouble should be classified as medicine. In the present case, defendant Turner made a practice of issuing prescriptions for lenses. Certainly the exemption in the medical practice act just referred to constitutes no authority for such practice. It was obvious to the court that Turner did not qualify under the medical practice act as a "physician and surgeon duly licensed to practice medicine."

The court could not agree with the appellants' contention that certain statutory provisions of the Georgia Code (Sec. 84-9918 and Sec. 84-9919), which in prohibiting the fraudulent practice of osteopathy employs the language "osteopathy, or other non-drug-giving school of medical practice," indicated a legislative intention to classify the practice of osteopathy as medical practice. Granting, said the court, that osteopathy is a nondrug-giving medical practice, a license so to practice cannot be a substitute for a license to practice medicine issued under the medical practice act. The positive requirements of the medical practice act cannot be evaded or nullified by the language used in a negative sense and for an entirely different purpose in the sections pointed out by the appellants. In the judgment of the court the appellants' contention was not bolstered by a section of the osteopathic practice act which declares that osteopaths shall observe and be subject to state and municipal regulations relating to the control of contagious diseases, the reporting and certifying of births and deaths, and all matters relating to public health, the same as physicians of other schools (Sec. 84-1211). This language, said the court, does not broaden the definition of an osteopath. It simply sets the requirements of others in the respects stated as a requirement for an osteopath.

The court refused to agree with the appellants' further contention that, since a license to practice osteopathy entitles the holder thereof to practice osteopathy as taught in reputable colleges of oseopathy and since the osteopathic college of which Turner was a graduate taught optometry, Turner's license authorized him to practice optometry without procuring a license under the optometry practice act. In the first place, said the court, the osteopathic practice act authorizes the practice of osteopathy, and that alone, as taught in reputable colleges of osteopathy, and optometry is not properly embraced within the meaning of osteopathy. In the second place, the osteopathic practice act was enacted in 1909 and the optometry practice act in 1916. The only persons relieved from procuring a license under the optometry act before engaging in the practice of optometry are "physicians and surgeons duly licensed to practice medicine," and osteopaths cannot be so classified. Therefore, even if originally the osteopathic practice act authorized one holding a license to practice osteopathy to practice optometry if it were taught in a reputable college of osteopathy, this rule was changed or repealed by the subsequent conflicting optometry practice act of 1916, which requires a license under that act lawfully to practice optometry. To the extent of any conflict the latter act, the optometry practice act, must govern.

Finally, said the court, a fair consideration of the various statutes of Georgia relating to the practice of medicine, the practice of optometry and the practice of osteopathy compels the conclusion that the legislature provided for the regulation and licensing of what it construed to be the practice of medicine under the medical practice act, and that although both optometry and osteopathy are arts of healing neither constitutes the practice of medicine. While the legislature has recognized osteopathy as one of the healing arts and has set up a plan for licensing osteopaths, it did not intend that osteopaths should be permitted to embrace the field of optometry and other professions by adopting the methods of healing practiced by such professions, on the theory that such methods are taught and practiced in reputable colleges of osteopathy. To construe the osteopathic practice act as urged by the appellants would mean that by merely teaching and practicing every known science of healing in osteopathic colleges an osteopath would be permitted to practice without restraint all such methods of healing. This would nullify every regulatory statute of the state having for its purpose the licensing and regulation of the practice of the various professions of healing authorized by law. Our conclusion is that Turner's license to practice osteopathy does not authorize him to practice optometry. It is conceded that if Turner's conduct is illegal, which it is, then since he is the employee and agent of Mabry this illegal practice is equally chargeable to Mabry and renders him likewise subject to an injunction.

For the reasons stated, the Supreme Court upheld the injunction of the trial court restraining Turner and Mabry from practicing optometry.—*Mabry v. State Board of Examiners in Optometry, 10 S. E. (2d) 740 (Ga., 1940).*

Society Proceedings

COMING MEETINGS

Annual Congress on Medical Education and Licensure, Chicago, Feb. 17-18. Dr. W. D. Cutter, 535 North Dearborn St., Chicago, Secretary.

American Orthopsychiatric Association, New York, Feb. 20-22. Dr. Norvelle C. La Mar, 149 East 73d Street, New York, Secretary.

Central Surgical Association, Ann Arbor, Mich., Feb. 28-March 1. Dr. George M. Curtis, Ohio State University, Columbus, Ohio, Secretary.

Middle Section, American Laryngological, Rhinological and Otological Society, Chicago, Jan. 27. Dr. Walter H. Theobald, 307 North Michigan Blvd., Chicago, Chairman.

Mid-South Post Graduate Medical Assembly, Memphis, Tenn., Feb. 11-14. Dr. A. F. Cooper, Goodwyn Institute Bldg., Memphis, Tenn., Secretary.

Pacific Coast Surgical Association, Los Angeles, Feb. 19-22. Dr. H. Glenn Bell, University of California Hospital, San Francisco, Secretary.

Society of Surgeons of New Jersey, Newark, Jan. 29. Dr. Walter B. Mount, 21 Plymouth St., Montclair, Secretary.

Society of University Surgeons, St. Louis, Feb. 14-15. Dr. Frank Glenn, 525 East 68th St., New York, Secretary.

Western Section, American Laryngological, Rhinological and Otological Society, San Francisco, Feb. 1-2. Dr. Robert C. Martin, 384 Post St., San Francisco, Chairman.

Current Medical Literature

AMERICAN

The Association library lends periodicals to members of the Association and to individual subscribers in continental United States and Canada for a period of three days. Three journals may be borrowed at a time. Periodicals are available from 1930 to date. Requests for issues of earlier date cannot be filled. Requests should be accompanied by stamps to cover postage (6 cents if one and 18 cents if three periodicals are requested). Periodicals published by the American Medical Association are not available for lending but can be supplied on purchase order. Reprints as a rule are the property of authors and can be obtained for permanent possession only from them.

Titles marked with an asterisk (*) are abstracted below.

American Journal of Diseases of Children, Chicago

60:1019-1244 (Nov.) 1940

*Treatment of Pneumonia in Children with Single Dose of Sulfapyridine. L. Platt, New York.—p. 1019.
Ascorbic Acid Content of Cow's Milk at Various Stages of Lactation. A. D. Holmes, F. Tripp, E. A. Woelffer, Boston, and G. H. Satterfield, Raleigh, N. C.—p. 1025.
Neuromuscular Mechanism of the Infant: Development Reflected by Postural Adjustments to Inverted Position. Myrtle B. McGraw, New York.—p. 1031.
Chorionic Gonadotropic Effects on Growth in Sexually Underdeveloped Older Boys. G. B. Dorff, Brooklyn.—p. 1043.
Anthropometry in Children: Progress in Allergic Children as Shown by Increments in Height, Weight and Maturity. M. B. Cohen, R. R. Weller, Cleveland, and S. Cohen, New Orleans.—p. 1058.
Relation of Sepsis to Infections of Upper Respiratory Tract. A. Kanof and B. Kramer, Brooklyn.—p. 1067.
Obesity in Childhood: IV. Energy Expenditure of Obese Children. Hilde Bruch, New York.—p. 1082.
Sexual Curiosity of Children. J. H. Conn, Baltimore.—p. 1110.
Blood Lipid Partition in Hypothyroidism of Childhood. L. S. Radwin, J. P. Michelson, J. Melnick and S. Gottfried, Brooklyn.—p. 1120.
*Equine Encephalomyelitis in Infancy. R. V. Platou, Minneapolis.—p. 1155.

Sulfapyridine in Pneumonia of Children.—Platt states that during the winter of 1939-1940 41 ward patients admitted to the Children's Hospital with pneumonia received one large dose of sulfapyridine. Private patients continued to be treated by multiple doses. The ages of the ward patients ranged from 2 months to 12 years. A roentgen diagnosis of lobar pneumonia was made in 27 and of bronchopneumonia in 14. Pneumococci were recovered from the nasopharyngeal and gag cultures of 37 children. Thirty-four patients were treated within four days of onset. The amount of sulfapyridine given was 0.3 Gm. per kilogram of body weight (2 grains per pound), as a suspension in either milk or a formula. The maximal dose was 4 Gm. Nothing was given by mouth for four hours, after which food was given as desired and fluids were forced. The rectal temperature of 34 children dropped to 100 F., or below, within twenty-four hours after the drug was given, and in 5 the fever continued after forty hours. Two of these 5 patients died. These were the only fatalities. A mild hydrothorax, which cleared spontaneously, developed in 1 child. There were no cases of empyema. One child responded promptly to treatment, but on the fourth day the pneumonia spread to another lobe and he responded promptly to a second single dose of sulfapyridine. There was a secondary rise in temperature in 14 patients. Usually this occurred on the second or third day after chemotherapy, although in 2 it occurred on the sixth day. With this secondary elevation of temperature the children did not look particularly ill and in all but 2 the temperature was again normal within twenty-four hours. Three of these children were given additional sulfapyridine, but the defervescence seemed no more rapid than in those not treated. The cause of the secondary rise in temperature is not known but does not seem to be important clinically. The level of free sulfapyridine in the blood of 35 patients was determined and of 26 it was above 4 mg. per hundred cubic centimeters. In most instances these levels were maintained in the blood for at least eighteen hours. In some, effective levels were maintained for at least thirty hours. In the remaining 9 children the lowest level was 1.9 mg. per hundred cubic centimeters of blood. One of these children died. In the other 8 the defervescence was as prompt and the clinical course as satisfactory as in those having levels above 4 mg. No rashes, blood dyscrasias or untoward mental symptoms were observed. Transient microscopic hematuria developed in 1 child, 12 children vomited once and 8 vomited more than once. Vomiting occurred when the children first received fluids. This vomiting did not interfere with the therapy, as by that time the sulfapyridine had passed into the intestinal tract and had been largely absorbed. Only 2 children had persistent vomiting, and 1 of these had pertussis. During the same period 24 private patients were treated by the multiple dose method. These children appeared no sicker than those in the ward. Four of 9 infants less than 1 year of age died in spite of receiving between 0.8 and 2 Gm. of sulfapyridine daily. Three children had no emesis, 3 vomited once and 18 more than once, and 4 of these vomited more than ten times. Only 1 child had a secondary rise in temperature, compared with 34 per cent in the single dose group. It appears that the single dose method simplifies the treatment and decreases toxic effects. It interferes less with the child's rest and sleep and is less demanding on the nursing staff.

Equine Encephalomyelitis in Infancy.—Review of literature on equine encephalomyelitis, according to Platou, suggests that the disease is a specific virus infection affecting a variety of animals, including man. Young persons are most susceptible. Its natural reservoir has not been recognized. Mosquitoes and ticks are the only proved vectors. The virus exists in the United States in at least two immunologically distinct strains. They are sharply demarcated geographically by the Appalachian Mountains. Experimentally, the course of infection with either of the strains can be divided roughly into visceral and neurotropic phases. Under natural conditions the disease in many cases may go unrecognized as abortive or poorly defined by visceral manifestations. The virus is best cultivated on the chorioallantoic membrane of the developing chick. Chick embryo vaccine treated with a solution of formaldehyde U. S. P. in wood alcohol and water seems the most practical and effective prophylactic agent for control of the disease in horses, but it has not as yet been used for the human subject. Hyperimmune serums appear to have no value in the treatment of experimental infections when given after fever has ensued. The author presents a case illustrating the postencephalitic state, probably an aftermath of infection with the virus of "equine" encephalomyelitis. The diagnosis was established by the demonstration of a high titer of antivirus antibodies for the western strain in the patient's serum six months after the initial acute infection. The mother's serum contained no protective substances against the virus. Equine encephalomyelitis should be considered in the differential diagnosis of the many obscure neurologic disorders in which mental retardation and spasticity are outstanding manifestations.

American Journal of Public Health, New York

30:1269-1390 (Nov.) 1940

Public Health in National Defense. W. S. Leathers, Nashville, Tenn.—p. 1269.
Prostitution as Source of Infection with Venereal Diseases in the Armed Forces. C. R. Reynolds, Harrisburg, Pa.—p. 1276.
Relationship of the Health of Civilians to Efficiency of the Army. J. C. Magee, Washington, D. C.—p. 1283.
Relationship of the Health of Civilians to Efficiency of the Navy, with Special Reference to the Venereal Disease Problem. C. S. Stephenson, Washington, D. C.—p. 1291.
Experience of the Army and Civilian Conservation Corps in Handling Newly Mobilized Men. A. P. Hitchens, Philadelphia.—p. 1297.
Present Status of Knowledge Concerning Influenza. F. L. Horsfall Jr., New York.—p. 1302.
*Typhoid Vaccine Studies: Revaccination and Duration of Immunity. D. Longfellow and G. F. Luippold, Washington, D. C.—p. 1311.
Human Relations as a Public Health Problem. H. L. Dunn, Washington, D. C.—p. 1318.
The Community Health Education Program: The Hartford Plan. Lucy S. Morgan and B. G. Horning, Hartford, Conn.—p. 1323.
Population Trends and Public Health Problems. F. Osborn, New York.—p. 1331.
Essentials of a Workable Merit System. D. C. Sowers, Boulder, Colo.—p. 1337.
The Merit System and Public Health. H. B. Mitchell, Washington, D. C.—p. 1343.
Health and Medical Preparedness. T. Parran, Washington, D. C.—p. 1348.
Illness Due to Commercially Prepared Egg and Olive Sandwiches Contaminated by Probable Carrier of Hemolytic Staphylococcus Aureus. J. C. Geiger and A. B. Crowley, San Francisco.—p. 1351.

Typhoid Vaccine Studies.—Longfellow and Luippold report on the effectiveness of typhoid vaccination as studied at the laboratories of the Army Medical School. The study considers the duration of immunity subsequent to vaccination and that

following revaccination by the intracutaneous injection of typhoid vaccine. Revaccination is the same as initial vaccination; three subcutaneous doses, 0.5, 1 cc. and 1 cc., respectively, at approximately weekly intervals. The three doses constitute a "standard course," which is prescribed for the military service, and military personnel are required to be revaccinated at intervals of three years. Exemptions are granted after two courses and to persons more than 45 years of age. A group of 189 young adult males who had received one standard course of typhoid vaccine intracutaneously from two to three years previously were selected for study. The blood serums of all members of this group after revaccination protected mice against at least one hundred minimal lethal doses and in 95 per cent against at least one thousand minimal lethal doses of the test organisms. Another group of 51 individuals were given 0.5 cc. of vaccine subcutaneously. Members of this group had received from one to seven standard courses of vaccine, the last of which had been given from two to twenty years ago. The blood serums were titrated immediately before and two weeks subsequent to revaccination. The blood serums of all members of this group after revaccination protected mice against at least one hundred minimal lethal doses and in 92 per cent of the cases against at least one thousand minimal lethal doses of the test organism. The results obtained in these two groups were compared with the usual method of revaccination for which 50 individuals who had received from one to five standard courses of vaccine were selected. They had had the last course at least two years previously. The members of this group were given a standard course of vaccine, and their blood serums were titrated immediately before and two weeks after administration of the third dose of vaccine. After revaccination the blood serums protected mice against at least one hundred minimal lethal doses and in 96 per cent it protected mice against at least one thousand minimal lethal doses of the test organism. The authors' studies on the duration of immunity among persons vaccinated only once and two or more times indicate that in order to maintain a high degree of immunity to typhoid, as indicated by humoral antibodies, revaccination at intervals of one year appears to be an advisable procedure, and certainly that the interval should not exceed two years. Revaccinations at the intervals recommended should not be discontinued because of age or because of many previous revaccinations.

Anesthesiology, New York

1:241-368 (Nov.) 1940

Surgical Posture, with Symbols for Its Record on the Anesthetist's Chart. A. H. Miller, Providence, R. I.—p. 241.
Studies of Vinethene as Anesthetic Agent. O. S. Orth, H. C. Slocum, J. W. Stutzman and W. J. Meek, Madison, Wis.—p. 246.
Mental Disturbances Following Nitrous Oxide Anesthesia. C. T. Batten, Battle Creek, Mich., and C. B. Courville, Los Angeles.—p. 261.
Studies with Cyclopropyl Methyl Ether (Cyprome Ether) in Man. Constance Black, G. E. Shannon and J. C. Krantz Jr., Baltimore.—p. 274.
Total Spinal Block: Preliminary Report. CoTui, C. L. Burstein and W. F. Ruggiero, New York.—p. 280.
Relaxation: Meditative Essay. N. A. Gillespie, Madison, Wis.—p. 292.
Control of Gastrointestinal Tone and Motility with Novatropine. S. J. Martin and R. C. Batterman, New York.—p. 300.
Anesthetic Potency of Some New Piperidine Derivatives. W. H. Hunt and R. J. Fosbinder, Newark, N. J.—p. 305.
Fate of Anesthetic Drugs in the Body. J. Adriani, New York.—p. 312.
Substances Causing Vasoconstriction. V. E. Henderson, Toronto.—p. 323.

Archives of Pathology, Chicago

30:1159-1318 (Dec.) 1940

Changes in Arteries in Walls of Tuberculous Pulmonary Cavities. R. Charr and J. W. Savacool, Philadelphia.—p. 1159.
Effect of Exposure to High Oxygen Tension on Lungs and Heart of Rat. D. J. Rehbock, Mary Ruth Oldt and H. M. Dixon, Cleveland.—p. 1172.
Effect on Prostate Gland of Occlusion of Its Ducts. C. Huggins and P. J. Clark, Chicago.—p. 1178.
Influence of Heptaldehyde on Carcinogenic Action of Methylcholanthrene. C. Carruthers, St. Louis.—p. 1184.
Effects of Yellow Phosphorus and Arsenic Trioxide on Growing Bones and Growing Teeth. C. O. Adams and B. G. Sarnat, Chicago.—p. 1192.
Diplomyelia (Duplication of Spinal Cord). R. Y. Herren, Portland, Ore., and J. E. Edwards, Boston.—p. 1203.
Triplication of Large Intestine. A. W. Gray, Montreal.—p. 1215.
Properties of Cancer Cells. E. V. Cowdry, St. Louis.—p. 1245.

Arkansas Medical Society Journal, Fort Smith

37:135-156 (Dec.) 1940

Premature Detachment of Normally Situated Placenta. R. M. Sloan, Jonesboro.—p. 135.
Foreign Bodies in Food and Air Passages. P. L. Mahoney and J. S. Agar, Little Rock.—p. 140.

Connecticut State Medical Journal, Hartford

4:707-780 (Dec.) 1940

*Can Diabetes Be "Cured" by Early, Vigorous Treatment? L. T. McDaniel, A. Marble and E. P. Joslin, Boston.—p. 710.
Some Medicolegal Problems. A. F. Mignone, New Haven.—p. 719.
Dissecting Aortic Aneurysm: Report of Two Cases. W. H. Lowell Jr., Hartford.—p. 724.
Early Days of the Fairfield County Medical Association. W. M. Stahl, Danbury.—p. 732.
Common Sense in Psychiatry. C. C. Burlingame, Hartford.—p. 735.
Child Guidance. G. K. Pratt, New Haven.—p. 739.
Diseased Cervix as Cause of Symptoms in Women. H. B. Perrins, New Haven.—p. 741.
Pregnancy Complicated by Cancer of Cervix: Case Report. A. H. Morse, New Haven.—p. 743.

"Curability" of Diabetes.—McDaniel and his co-workers studied the records of diabetic patients in the hope of discovering any analogies between the cause of their diabetes and that produced experimentally in animals and to see if any patients could be found who seemingly were cured or had benefited by early energetic treatment. The records of those few patients were studied in whom at postmortem examination there were microscopic evidences of hydropic degeneration of the islet cells. Recent work has shown that at this stage of degeneration of islet tissue the process is reversible. The data show that, although no cures can be claimed, early, vigorous treatment in certain patients with either a restricted diet or insulin or both seems to have brought about an unexpected degree of amelioration. However, many other patients, similarly treated, responded with only the expected improvement. A review of cases in which the onset of the diabetes had been "rapid," "gradual" or even "indefinite" may show many cases in which proper treatment ameliorated the disease. Resting procedures (fasting, fat feeding and insulin) prevent the degenerative changes from occurring in cells not already affected and permit the restoration of those exhausted cells which still retain the ability to recover. This suggests a logical basis for the Naunyn dictum that a patient with severe diabetes carefully treated often does well, whereas a patient with mild diabetes, if neglected, does poorly. Degenerative factors other than infections and the diabetogenic hormone of the anterior pituitary may exist. The undiscovered factors may be more frequent in occurrence and more insidious in their action. Education of laymen, and particularly relatives of diabetic patients, is the most effective approach to shortening the interval between the onset of the disease and diagnosis. Yearly physical and urinary examinations should be done, and companies insisting on regular, routine examination of their employees are doing them a kindness. All school children should have yearly examinations. Relatives of diabetic persons should be examined even more frequently and should have periodic blood sugar tests. The importance of obesity and heredity should never be slighted or neglected. Haist, Campbell and Best suggest the prophylactic administration of insulin and a low carbohydrate, high fat diet for large groups of persons with potential diabetes (children of diabetic families). The authors suggest that a feasible way to test the validity of experimental observations is to start the nondiabetic twin of similar twins on insulin as soon as the diagnosis is made in one of them, since the disease will eventually develop in the other one. Prophylactic treatment would also be of equal value in children of conjugal diabetic persons. Protamine zinc insulin by its continuous release of active insulin affords the constant effect of a protective mechanism. All diabetic children should take at least a small daily dose of protamine zinc insulin. A good response to initial treatment is never an indication for a rapid reduction of insulin or its omission, for the neglect of diet or for the toleration of obesity. The authors state that diabetes is never "complete" until death occurs—there are always some functioning islet cells and to keep them in a functioning state is the main goal of treatment. If a patient with diabetes of recent and rapid onset presented himself, the authors would immediately begin vigorous treatment with insulin and a low

carbohydrate diet with the required calories made up in fat. If after a few weeks there was no significant amelioration they would increase the diet to one of moderate carbohydrate restriction, assuming that by this time all the beta cells which could recover had done so. They would be extremely slow in reducing the insulin dosage and diligent in its use with intermittent infections. They believe that a diabetic patient should be taught to guard his islet tissue as he does his toes and limbs.

Delaware State Medical Journal, Wilmington

12:231-244 (Nov.) 1940

Right Paraduodenal Hernia. W. E. Bird, Wilmington.—p. 231.

Georgia Medical Association Journal, Atlanta

29:475-518 (Oct.) 1940

Use of Pentothal Sodium-Oxygen Anesthesia as a Total Anesthetic Agent in Major Surgical Procedures. T. C. Davison and F. F. Rudder, Atlanta.—p. 475.

Therapy of Menometrorrhagia: I. Study of Mechanism of Uterine Bleeding: II. Study of Postpartum Period. R. B. Greenblatt, Augusta.—p. 481.

Functional Heart Disease. J. A. Redfearn, Albany.—p. 486.

Therapy of Third, Fourth and Fifth Venereal Diseases. M. T. Benson Jr. and J. A. Henry, Atlanta.—p. 489.

Carcinoma of the Prostate. M. L. Boyd and J. B. Nuckolls, Atlanta.—p. 493.

Pancreatitis: Report of Cases. G. J. Dillard, Columbus.—p. 499.

Further Observation on Antenatal Use of Quinine. L. Smith, Atlanta.—p. 502.

Rocky Mountain Spotted Fever: Case Report. A. Chappell, Atlanta.—p. 504.

Treatment of Body Fluid Loss. F. K. Boland, Atlanta.—p. 505.

Iowa State Medical Society Journal, Des Moines

30:565-626 (Dec.) 1940

State and City Wide Plans for Care of Premature Infant. J. H. Hess, Chicago.—p. 565.

Use of Burbot Liver Oil Intramuscularly for Ocular Avitaminosis A. H. C. Kluever, C. H. Coughlan and L. M. Martin, Fort Dodge.—p. 575.

Obstacles to Effective Control and Prevention of Scarlet Fever. G. W. Anderson, Minneapolis.—p. 580.

The 1939 Poliomyelitis Epidemic in the City of Des Moines. E. M. George and H. E. Ransom, Des Moines.—p. 584.

Observed Relationship of Poliomyelitis Incidence and Environmental Sanitation in Des Moines, Iowa. R. C. Hanlon, Des Moines.—p. 587.

Ophthalmologists and Elementary Education. G. C. Albright, Iowa City.—p. 590.

Diagnosis and Treatment of Paroxysmal Tachycardia in General Practice. O. Neurath, Sigourney.—p. 596.

Journal of Allergy, St. Louis

12:1-116 (Nov.) 1940

Cholinesterase in Blood of Allergic Patients. R. C. Hawes and G. A. Alles, Los Angeles.—p. 1.

Quantitative Measurement of Whealing in Hypersensitiveness to Cold Treated with Histamine and Histaminase. F. E. Maisel and H. A. Abramson, New York.—p. 6.

Snake Venom and Allergy. H. G. Golan, Richmond Hill, N. Y.—p. 11.

Time Required for Production of Hay Fever by Spores of Newly Encountered Fungus, Johnson Grass Smut. E. W. Phillips, Phoenix, Ariz.—p. 24.

Erythema Nodosum from Sulfanilamide: Some Experimental Aspects. A. B. Loveman and F. Simon, Louisville, Ky.—p. 28.

*Food Sensitivity as Factor in Etiology of Acne Vulgaris. F. E. Cormia, Montreal.—p. 34.

Allergic Rhinitis and Asthma Due to Sensitization to the Mexican Bean Weevil (Zabrotes Subfasciatus Boh.). F. W. Wittich, Minneapolis.—p. 42.

Relationship of Mold Reactions to Clinical Symptoms. R. Chobot, H. Dundy and N. Schaffer, New York.—p. 46.

Clinical Comparison of Epinephrine in Oil and Epinephrine in Gelatin. M. Kalmon, Akron, Ohio.—p. 55.

Food Sensitivity and Acne Vulgaris.—Cormia suspected food sensitivity in 25 of 80 private patients with acne vulgaris. Twenty of them were given elimination diets. Twelve additional patients, all with severe acne of two or more years but lacking a history of food sensitivity were included as a basis for comparison. Skin testing with the common food allergens was done in 13 of the 32 from 15 to 34 years of age who had had acne from two to seventeen years. The results were checked against those obtained with the elimination diets. There was a family history of acne and seborrhea in 22, of infection in 17 and a definite history of atopy in only 10 families. The chief aggravating factors were inadequate rest, menstrual periods and alcohol. Sixteen patients believed that one or more foods caused flare-ups. All patients were placed on elimination diets; roentgen therapy was used but was delayed until food testing was nearly complete, and endocrine therapy was given when indicated. The foods most frequently mentioned were chocolate and tomatoes. Other foods incriminated were pork, potatoes, cheese, bread, eggs, apples, tea, coffee and oranges. Of the twenty-four foods listed by 16 patients, thirteen caused a flare-up of the eruption on ingestion. Four patients would not be tested by ingesting the specific food because of previous severe reactions. Generally the patients who reacted most vigorously to the ingestion tests gave positive intradermal reactions to the food in question. After the eruption improved, the foods were gradually reintroduced into the diet, and only rarely did they cause subsequent reactions. The foods, in order of frequency, causing demonstrable flare-ups were chocolate, tomatoes, nuts, spinach, wheat, white bread, coffee, potato, eggs, peas, grapefruit, milk, string beans, tea, beef, oatmeal, fish, corn, carrot, lettuce, beet, cheese and cabbage. Four patients reacted positively to white bread but gave negative reactions to wheat. This is confirmatory evidence that bread improvers containing bromates could be responsible for flare-ups (Wise and Sulzberger). Food elimination diets were curative in 2 patients, showed from 75 to 90 per cent improvement in 5 and from 50 to 75 per cent improvement in 8. The observation period was from one to three years.

Journal of Nutrition, Philadelphia

20:519-646 (Dec.) 1940. **Partial Index**

Multiple Deficiencies in Modified Goldberger Diet as Demonstrated with Chicks. H. A. Waisman and C. A. Elvehjem, Madison, Wis.—p. 519.

Pantothenic Acid Requirement of Rat. K. Unna, Rahway, N. J.—p. 565.

Effect of Vitamins A and C on Experimental Hyperthyroidism. I. J. Belasco and J. R. Murlin, Rochester, N. Y.—p. 577.

Influence of Exercise on Growing Rat in Presence and Absence of Vitamin B1. N. B. Guerrant and R. A. Dutcher, State College, Pa.—p. 589.

Studies on Dermatitis in Chicks Distinct from Pantothenic Acid Deficiency. D. M. Hegsted, J. J. Oleson, R. C. Mills, C. A. Elvehjem and E. B. Hart, Madison, Wis.—p. 599.

Journal of Pharmacology & Exper. Therap., Baltimore

70:245-322 (Nov.) 1940. **Partial Index**

Histologic Effects of Intraneural Injections of Quinine Compounds. R. Salm, Edinburgh, Scotland.—p. 245.

Studies on Purified Digitalis Glucosides: II. Potency and Dosage of Lanatoside C in Man. N. T. Kwit, H. Gold and M. Cattell, New York.—p. 254.

Further Observations on Influence of Dietary Protein on Toxicity of Selenium. M. I. Smith and E. F. Stohlman, Washington, D. C.—p. 270.

Thiamine in Treatment of Morphine Abstinence Syndrome in Man. C. K. Himmelsbach, Lexington, Ky.—p. 293.

Emptying Time of Normal Human Stomach as Influenced by Sulfapyridine. D. W. Northup and E. J. Van Liere, Morgantown, W. Va.—p. 297.

New England Journal of Medicine, Boston

223:835-876 (Nov. 21) 1940

Organization of Psychiatric Clinic in Outpatient Department of a General Hospital. R. Fleming, G. P. Coon, A. W. Contratto, J. M. Flynn, C. R. Atwell and Gerna S. Walker, Boston.—p. 835.

*Cancer of Stomach. H. M. Clute and T. J. Anglem, Boston.—p. 839.

*New Type of Medication to Be Used in Bronchial Asthma and Other Allergic Conditions: Preliminary Note. E. A. Brown, Boston.—p. 843.

Diverticulitis. J. F. Erdmann, New York.—p. 846.

*Radiation Treatment of Plantar Warts. J. H. Marks and C. C. Franseen, Boston.—p. 851.

Wartime Preventive Medicine. C. A. Janeway, Boston.—p. 854.

Cancer of Stomach.—During the five years ended January 1940 Clute and Anglem treated 68 patients diagnosed preoperatively as having gastric cancer. On exploration 5 presented benign or no lesion. Of the remaining 63, 11 were not suitable for exploration, 19 on exploration were found inoperable, 8 were suitable for only palliative operations and 25 had resection. Of the 27 resectable lesions, including 2 that were benign or borderline, 2 were so extensive as to require total gastrectomy. The postoperative mortality was 15 per cent. Three of the deaths were from peritonitis and 1 from bronchopneumonia. The 2 patients on whom total gastrectomies were performed were alive twenty months after operation. One of them has not been observed, but he reports that he feels well and works every

day. The other patient was recently reoperated on for bilateral Krukenberg ovarian tumors, and several small metastatic peritoneal implants were observed. In 1935, 1936 and 1937, 12 patients survived resection. Although 7 of these lived for two years or more, all but 1 is now either dead or has a definite recurrence. In 1938 and 1939, 11 successful resections were done. All the patients are still alive, although 2, who have lived twenty months following operation, have a recurrence. The results show that preoperative diagnosis cannot be overemphasized. The inability of the roentgen diagnostician to differentiate definitely between ulcer and cancer may easily lead to undesirable delay in instituting proper therapeutic measures. When the roentgenogram suggests cancer, immediate surgery is preferable to delay and repeated roentgen examination. Long delays must be avoided. Accuracy of diagnosis should embrace the separation not only of malignant from nonmalignant lesions but also operable from inoperable cases. The criteria that indicate inoperability are the presence of a large fixed mass, ascites, involvement of the cardiac opening of the stomach, a roentgenogram showing the stomach drawn close to the spine or to the right of it, a large nodular liver and distant metastases. When any doubt as to operability exists exploration should be done, for often cases that preoperatively appear to be doubtful are on exposure readily operable. The development of peritoneoscopy may aid in the recognition of inoperable cases that in the past have come to exploration.

New Medication for Asthma and Other Allergies.—Brown suggests the use of capsules containing ½ grain (0.032 Gm.) of ephedrine sulfate, ½ grain of sodium phenobarbital and 3 grains (0.2 Gm.) of theophylline sodium acetate for symptomatic or prophylactic treatment of nocturnal bronchial asthma. He has used this medication in 189 cases of bronchial asthma and also for other allergic complaints. The asthma in the cases reported was extrinsic in 80, intrinsic in 50 and mixed in 10 cases. In every case in which the usual doses of ephedrine and phenobarbital were adequate the capsule described was equally or more effective. Thirteen patients complained of side reactions to the ephedrine. Six patients complained of nausea and indigestion. This was found to be due to the theophylline sodium acetate, and they were given capsules without this component. Sensitivity to phenobarbital was not encountered, and there was no case of a sedative "hangover" due to the phenobarbital. Two patients complained that all gelatin capsules caused pyrosis. The dosage having been stabilized, an enteric coating planned to dissolve in from four to five hours was manufactured. It contained cetyl alcohol, gum mastic, tolu balsam, gelatin, acacia and sugar. Acetone, alcohol and water were used as solvents. The enteric coated tablets were given to 117 patients, 61 of whom also received the plain capsule as their asthma occurred during the day, during the first four hours after retiring or during both periods. The remaining 56 patients had asthma only four or more hours after retiring and were given only the enteric coated capsules. Of the 117 patients, 8 complained of waking six hours after medication. They were free of asthma but unable to fall asleep again. This was attributed to the theophylline, and either it was omitted or additional phenobarbital was given. The patients with asthma during both day and night showed the best improvement. The ability to sleep during the night lessened the number or intensity of their daily attacks. This was especially true of the intrinsically asthmatic patients. Not all patients got relief at all times. Those with severe attacks who were not helped formerly by ephedrine and phenobarbital alone were only occasionally benefited by the capsules and tablets. The new medication was definitely more effective in patients with moderate and mild symptoms.

Radiation Treatment of Plantar Warts.—Marks and Franseen stress the need of careful search for a wart in any painful callus. Such warts do not project above the surrounding skin on weight-bearing surfaces but are flat and usually surrounded by callus formation. Small, reddish or brownish black dots may be seen through the callus or will become evident by moistening the callus or paring away the less translucent superficial layers. These dots represent the capillary loops of the wart. At the Palmer Memorial Hospital irradiation has given a high percentage of satisfactory results. However, during the last two years a number of unfortunate results from roentgen and radium treatment have come to the authors' attention and suggested an analysis of the 175 cases treated between January 1930 and May 1939. The primary treatment of 158 cases was by radium: once in 115 cases, twice in 26 and three or more times in 8. The primary radium treatment failed in 9 and was followed by some other method. Twenty-nine of the radium-treated patients returned for examination, and 22 were cured: 16 after one treatment and 6 after two or more treatments. Of the 6 patients treated two or more times, 2 had minor atrophic changes in the skin and 1 had marked atrophy at the site of treatment and likely to lead to a radiation ulcer at a later date. Radium treatment did not result in cure in 7; 1 was cured by electrodesiccation and 1 by excision, 1 had a persistently painful wart within an area of atrophy and 4 later received roentgen therapy. Since 1937, 15 patients have been treated primarily by roentgen rays. All these patients were reexamined one year or more after treatment; 10 showed complete cure (with only 1 showing slight cutaneous atrophy at the treatment site), 1 with a wart on the great toe had such marked atrophy that amputation of the toe became necessary when ulceration occurred after trauma, 1 showed a small remnant of the original wart but was symptom free and 3 failed to obtain cure but were later treated successfully by electrodesiccation. Of 6 patients who had roentgen treatment following failure of radium, only 2 had satisfactory end results. The remaining 4 had radiation ulcers necessitating surgical procedures to replace the damaged tissues. Excision of the area of ulceration followed by plastic repair was required by 3 and the toe of 1 was amputated. All had received two or more radium treatments followed by roentgen treatment and had been treated over periods of five, five, nine and eleven years, respectively. The experiences of these patients indicate that repeated heavy doses of roentgen rays or radium should not be employed in treating plantar warts. A long interval between treatments increases rather than decreases the danger. The authors believe that many enthusiastic recommendations of radiation treatment are based on follow-ups made too soon after treatment and before the late end results are known. Although symptoms may be relieved, the condition may recur later and with large doses or repeated treatments there is always danger of late adverse radiation effects. The area so treated by large single doses should not exceed 1 cm. in diameter: 16 millicurie hours of radon filtered through 0.3 mm. of steel and from 1,200 to 1,800 roentgens, depending on the site and size of the lesion. Larger doses are required when the wart is in the tougher tissues of the ball of the foot. If a single radiation treatment fails to cure, the method should be discontinued. Electrodesiccation, when properly carried out, gives excellent results. The absence of late after-effects and the certainty of complete eradication if done thoroughly under adequate local anesthesia compensate for the slight immediate discomfort. It is essential to desiccate thoroughly the soft, active base of the wart that lies deep beneath the callus. In all cases in which radiation has failed, electrodesiccation has succeeded in eradicating the wart.

North Carolina Medical Journal, Winston-Salem

1:579-630 (Nov.) 1940

*Clinical Observations on Local Use of Sulfanilamide in Dentistry. J. A. Sinclair, Asheville.—p. 579.
Orbital Tumors and Their Surgical Treatment. A. B. Reese, New York.—p. 583.
Clinical Interpretations and Applications of Electrocardiograms. V. S. Caviness, Raleigh.—p. 592.
Joint Responsibility for Maternal Welfare in the Light of Current Social Trends. W. Z. Bradford, Charlotte.—p. 597.
Endometriosis. W. B. Bradford, Charlotte.—p. 600.
The Blood Bank. R. B. Davis, Greensboro.—p. 606.
New Conception of Essential Hypertension. F. B. Marsh, Salisbury.—p. 608.
It May Be Helminths. C. A. Willis, Candler.—p. 613.
Dry Ice Treatment for Hiccup. M. A. Pittman, Wilson.—p. 615.

Local Use of Sulfanilamide in Dentistry.—According to Sinclair, sulfanilamides have been employed in cellulitis, acute osteomyelitis and infected compound fractures. Acute necrotic gingivitis (Vincent's infection) does not respond well to sulfanilamide, and its use in chronic osteomyelitis is questionable. His clinical observations on the local use of sulfanilamide dur-

ing the last three years following all extractions and operations justify their continued use. No local toxic effect has been encountered. Roentgenograms of sockets thus treated show a normal filling in of bone substance. Swelling or fever has not been observed following extraction of teeth. Healing during this therapy has been normal. Sulfanilamide will not prevent autolysis of the blood clot (dry socket) when excessive trauma has been produced during extraction of teeth with roots embedded in a sclerosed area of bone. Interosseous circulation is scanty in this area, if present at all. Sulfanilamide is unable to prevent the "dry socket" under this condition, but it does prevent pain and hastens healing by controlling infection. Such lesions are similar to compound fractures after they have been reduced. So far the author has not observed any drug incompatible with sulfanilamide when both are used locally. Sulfanilamide placed in the socket of a recently extracted tooth does not cause a true in vivo or in vitro state, but it is nearer the in vitro condition. There is no circulation within the area until granulation begins, although there is a migration of leukocytes and serum seepage into the area. Because of the noncirculatory status of the area, the value of systemic administration is questionable. The placing of a part of a tablet into the socket enables it to take up its maximal concentration of sulfanilamide. This maximal saturation is maintained by the excess chemical. This is also true of a compound fracture or of osteomyelitis. Sulfapyridine has not been found superior to sulfanilamide, and the author has discontinued its use.

Ohio State Medical Journal, Columbus

36:1249-1368 (Dec.) 1940

Clinical and Experimental Aspects of Mode of Action of Sulfanilamide-Sulfapyridine Compounds. R. R. Mellon, Pittsburgh.—p. 1265.
Influence of Overcrowding on Incidence of Pneumonia. J. E. Benjamin, J. W. Ruegsegger and Fanny A. Senior, Cincinnati.—p. 1275.
Treatment of Disorders of Thyroid. R. A. Ramsey, Columbus.—p. 1282.
Complications About Eye in Acute Infectious and Contagious Diseases. J. A. Toomey, Cleveland.—p. 1287.
Empyema Thoracis: Method of Treatment by Continuous Tidal Irrigation and Drainage. J. Greenfield, Cleveland, and G. M. Curtis, Columbus.—p. 1291.
Special Education for the Physically Handicapped. Hazel C. McIntire, Columbus.—p. 1297.
Sterility. C. W. Pavey, Columbus.—p. 1299.
Use and Abuse of Cesarean Section. D. D. Forward, Ashtabula.—p. 1305.
Congenital Deformity of Trachea. J. J. Marek, Cleveland.—p. 1308.
Anemias of Infancy and Childhood. C. R. Rittershofer, Cincinnati.—p. 1309.

Oklahoma State Medical Assn. Jour., Oklahoma City

33:1-58 (Oct.) 1940

Multiple Polyposis of Gastrointestinal Tract: Case Report. F. A. Glass, Tulsa.—p. 1.
Diverticulectomy. A. L. Clark, Oklahoma City.—p. 3.
Brain Tumors I've Met. E. H. Coachman, Muskogee.—p. 7.
Liver Damage. T. H. McCarley, McAlester.—p. 10.
Osteomyelitis as Cause of Crippling in Children. W. K. West, Oklahoma City.—p. 13.
The Freedom of Science. L. J. Moorman, Oklahoma City.—p. 15.

Philippine Medical Association Journal, Manila

20:567-636 (Oct.) 1940

Hematologic Findings in Chronic Hemolytic Anemia (Familial Jaundice). R. J. Navarro and J. R. Cruz, Manila.—p. 567.
First Three Years of Weekly Staff Clinical Conferences. J. Albert and P. Ignacio, Manila.—p. 573.
Time Element in Conduct of Child Health Clinics. T. M. Gan and A. Cruz, Manila.—p. 605.

Psychoanalytic Quarterly, Albany, N. Y.

9:453-602 (Oct.) 1940

Utilization of Early Current Dreams in Formulating Psychoanalytic Cases. L. J. Saul, Chicago.—p. 453.
Contribution to the Psychoanalysis of Extreme Submissiveness in Women. Annie Reich, New York.—p. 470.
Four Types of Neurotic Indecisiveness. E. Bergler, New York.—p. 481.
Experiences in Psychoanalytic Treatment of Psychotics. D. M. Bullard, Rockville, Md.—p. 493.
Aggression in Rescue Fantasy. R. Sterba, Detroit.—p. 505.
Psychologic Significance of Du and Sie. W. V. Silverberg, New York.—p. 509.
Society and the Individual. G. Róheim, Worcester, Mass.—p. 526.

Public Health Reports, Washington, D. C.

55:1977-2040 (Nov. 1) 1940

Frequency and Volume of Doctors' Calls Among Males and Females in 9,000 Families, Based on Nationwide Periodic Canvasses, 1928-1931. S. D. Collins.—p. 1977.

55:2041-2098 (Nov. 8) 1940

Teaching of Social Medicine in Liberal Arts Colleges and Universities. J. Hirsh and Elizabeth G. Pritchard.—p. 2041.
Accidents in the Urban Home as Recorded in the National Health Survey. R. H. Britten, Joan Klebba and D. E. Hailman.—p. 2061.

55:2099-2142 (Nov. 15) 1940

Studies of Acute Diarrheal Diseases: IV. Outbreak of Bacillary Dysentery Due to "Newcastle Dysentery Bacillus." A. V. Hardy, S. Frant, S. W. Jarcho and E. G. Schlosser.—p. 2101.
Experimental Production of Agglutinins for Trypanosoma Cruzi. A. Pachchanian.—p. 2116.
Highly Virulent Strains of Rocky Mountain Spotted Fever Virus Isolated from Ticks (Dermacentor Variabilis) in Georgia. G. D. Brigham and J. Watt.—p. 2125.
Disabling Morbidity Among Industrial Workers, Second Quarter and First Half of 1940, with Note on Occurrence of Bronchitis, Pneumonia and Appendicitis, 1931-1940. W. M. Gafafer.—p. 2127.

55:2143-2194 (Nov. 22) 1940

Comprehensive Study of Influenza in a Rural Community. E. R. Rickard, E. H. Lennette and F. L. Horsfall Jr.—p. 2146.
Sanitary Log for American Ships: Description and Plan of Operation. G. C. Sherrard.—p. 2167.
*Pneumonic Plague in Ecuador During 1939. J. R. Murdock.—p. 2172.
Period of Antibody Development to Lymphocytic Choriomeningitis in Mice. R. A. Lyon.—p. 2178.

Pneumonic Plague in Ecuador During 1939.—Murdock states that during 1939 three outbreaks of pneumonic plague occurred in Ecuador. The first occurred during January and February in Riobamba and caused 17 deaths, the second during April in Columbe caused 14 deaths; both of these were in the province of Chimborazo. The third outbreak, which occurred during September, started in Cofradia near Catacocha and extended to the city of Loja in the province of Loja. It caused at least 7 deaths. From the first two outbreaks there was no definite proof that secondary pneumonia developed in the patients with bubonic plague, but in Loja the history was definite; there the first primary case of plague pneumonia was diagnosed and followed through. Bubonic plague has been present in Ecuador since 1908. It has spread from the ports to the mountain districts along the rivers, railroads, highways and mule trails. The Norway rat (Rattus norvegicus), the Alexandrinus (Rattus alexandrinus) and Rattus rattus have been the responsible hosts. From them the disease has spread to domestic guinea pigs, wild rats (ratas de campo), rabbits (conejos), squirrels (ardillas) and probably other rodents. The best methods to control and break the chain of an outbreak are rigid isolation of the infected patients with the recognition of the first suggestive symptom, strict quarantine of all persons who have been in direct contact with an infected person or persons, protection of nurses and doctors in attendance by suitable head masks, gowns and rubber gloves, thorough disinfection and fumigation of quarters occupied by the patients and a house to house inspection of infected sectors, with temperature taken twice daily and isolation of all who have a fever regardless of cause. It is the author's opinion that outbreaks of pneumonic plague result from cases of bubonic plague in which secondary pneumonia develops. This was the case in the Loja outbreak. Physicians and health officers in any endemic plague region should suspect all patients with pneumonic symptoms and especially those who die in less than four days. Patients with pneumonic plague may cough but little, the cough is soft and easy, and the sputum in the early stages may contain small flecks of pus and become blood stained only in the last stages of disease, but it is extremely cohesive and forms long, fine filaments when a portion of it is separated from the mass specimen.

Rhode Island Medical Journal, Providence

23:163-180 (Oct.) 1940

The Care of the Patient with Peptic Ulcer. E. S. Emery Jr., Boston.—p. 163.
Usher Parsons, a Founder of the Rhode Island Hospital. A. H. Miller, Providence.—p. 168.

Rocky Mountain Medical Journal, Denver

37:797-924 (Nov.) 1940

Principles of Management of Infections of Hand. M. L. Mason, Chicago.—p. 814.
New Deal Medicine Man. L. E. Likes, Lamar, Colo.—p. 824.
Public Relations and the Medical Profession. J. B. Farley, Pueblo, Colo.—p. 830.
Obesity: Its Significance and Treatment. C. F. Kemper, Denver.—p. 835.

37:925-1028 (Dec.) 1940

Objectives of American Medicine. N. B. Van Etten, New York.—p. 942.
Role of Voluntary Hospitals in a National Emergency. A. F. Emch, Chicago.—p. 948.
Lesions of Hip in Childhood and Adolescence and Their Relation to Lesions of Hip in the Adult. R. K. Ghormley, Rochester, Minn.—p. 956.
Subdiaphragmatic Abscess of Amebic Origin: Brief Review of Literature. O. J. La Barge, New Orleans.—p. 961.
Obstetric Hemorrhages. E. L. King, New Orleans.—p. 970.
Screen Test Developed in Laboratory of the Colorado State Board of Health in the Serology of Syphilis. W. C. Mitchell, Denver.—p. 977.

Southern Medical Journal, Birmingham, Ala.

33:1241-1376 (Dec.) 1940. **Partial Index**

Collapse Therapy in a State Tuberculosis Program. E. C. Harper, Richmond, Va.—p. 1241.
Nonsurgical Management of Lung Abscess. H. E. Johnson, Nashville, Tenn.; W. Pyle, Franklin, Tenn., and H. J. Shull, Shelbyville, Tenn.—p. 1245.
New Industrial Chemical Dermatitis. K. O. Stingily, Meridian, Miss.—p. 1268.
*Diethylstilbestrol: Clinical Evaluation of Various Modes of Administration. R. B. Greenblatt, R. Torpin and W. R. Brown, Augusta, Ga.—p. 1276.
Cause of Menstruation and Uterine Bleeding: New Theory. K. J. Karnaky, Houston, Texas.—p. 1285.
Use of Diethylstilbestrol in Treatment of Menopausal Syndrome. H. S. Everett and H. G. Bennett Jr., Baltimore.—p. 1290.
Effect of Diet on Red Cell and Hemoglobin Formation, Blood Nitrogen and Albuminuria. H. M. Doles, Norfolk, Va.—p. 1298.
*Blood Potassium Studies in Allergic States: Relation to Potassium Therapy. F. P. Parker, Emory University, Ga.—p. 1301.
Thyroid in Allergy: Preliminary Report Based on Study of Basal Metabolic Rates and Cholesterol Determinations in Group of Allergic and Nonallergic Patients. M. C. Barnes, Waco, Texas.—p. 1310.
Hypothyroidism as Etiologic Factor in Seasonal Dermatitis. J. E. Hubbard and W. B. Martin, Huntington, W. Va.—p. 1312.
Importance of Psychogenic Factors in Treatment of Allergic Disturbances. O. C. Hansen-Pruss, Durham, N. C.—p. 1317.
Chorea of Infectious Origin. E. F. Reaser, Huntington, W. Va.—p. 1324.
Carbohydrate Metabolism in Presence of Infection. J. O. Lisenby, Atmore, Ala.—p. 1328.
Focal Infection in Relation to Cardiovascular Disease and Disorder Among Railroad Employees. G. I. Jones, Washington, D. C.—p. 1330.
External Ear Disease, with Special Reference to Fungous Type. B. H. Minchew, B. E. Collins and M. M. Harris, Waycross, Ga.—p. 1345.

Diethylstilbestrol.—Between March 1939 and February 1940 Greenblatt and his associates used diethylstilbestrol for 79 patients requiring estrogen therapy. The routes of administration were parenteral, oral, vaginal and percutaneous. The dosages employed were as a rule aimed at symptomatic relief and not to test tolerance. Each of the various routes of administration has shown itself practical in maintaining a high estrogenic level. When administered parenterally its effect was not so sustained as that of estradiol benzoate. Eleven per cent of the patients receiving diethylstilbestrol parenterally experienced some nausea. The oral route, with either plain or enteric coated tablets, proved unsatisfactory as more than 50 per cent experienced undesirable side effects. Diethylstilbestrol dissolved in alcohol and used as a percutaneous rub, though not so effective, proved a convenient mode of administration. Undesired side reactions were reduced to a minimum. The most effective method of administration was vaginal suppositories. As little as 0.1 mg. in suppository form administered nightly to patients with menopausal syndrome frequently transformed the vaginal smear from castrate to a positive estrus in seven days with alleviation of menopausal symptoms. Although 26 per cent of this group experienced side effects, they were never severe, amounting only to slight vaginal soreness or mild nausea. Side effects are probably central in origin. Local irritation of gastric and intestinal mucosa evidently plays a contributory role in gastrointestinal disturbances. In most patients who exhibited side effects a tolerance developed when the dosage was reduced or its mode of administration changed. Stilbestrol was well tolerated and proved particularly efficient in the suppression of lactation. The drug is quickly absorbed and eliminated, and therefore medication should be tapered off slowly in the treatment of this condition.

Blood Potassium in Allergy.—Parker determined blood serum potassium levels of 28 normal and 35 allergic patients suffering from vasomotor rhinitis, eczema, hay fever, urticaria and asthma. The values of the forty-seven determinations performed on the 28 normal individuals ranged from a low of 16.5 to a high of 21 mg. per hundred cubic centimeters; the average value was 18.47 mg. This average falls slightly below the range of from 19 to 21.2 mg. as given by MacCallum but agrees in general with a majority of normal values reported. Only 4 per cent of the determinations fell outside the range of from 16 to 20 mg. Repeated basal determinations of four normal persons were made at weekly intervals and they suggest that there exists, in each normal person, a basal potassium level from which little deviation occurs and that normal levels in different individuals generally fall within a somewhat wider range. The basal determinations among the 35 allergic persons, all of whom were showing some active manifestation of their allergic state at the time of the test, ranged from a low of 13.9 to a high of 22.8 mg. per hundred cubic centimeters. The average of the group was 18.25 mg. The potassium levels of those persons having asthma and hay fever were usually above the average, while those with eczema and vasomotor rhinitis were below. The 35 patients (with one exception) were then given either potassium chloride or potassium gluconate daily by mouth, serum potassium determinations were made at intervals of from seven to fourteen days and the daily dose of potassium was increased in accordance with the degree of relief experienced. The effective daily dose of potassium was from 15 grains (1 Gm.) to 60 grains (4 Gm.) of the chloride and from 45 grains (3 Gm.) to 125 grains (8.3 Gm.) of the gluconate. Of the 34 persons receiving treatment, 22 showed marked or complete relief of symptoms, 4 moderate relief, 4 slight improvement and 4 experienced no beneficial effect. The degree of relief appeared to be in proportion to the daily potassium intake in any single patient, since decrease of the size of the daily dose or its omission for only two days resulted in recurrence of symptoms, which again disappeared when the effective dose was resumed. The degree of relief has been sustained by all patients, in the majority of whom the observation period was from six to eleven months. There were no cumulative effects. Patients with asthma, hay fever and vasomotor rhinitis derived about equal benefit from potassium therapy while those with eczema showed little improvement. This suggests a different mechanism in the atopic and nonatopic allergic conditions. The two potassium preparations were equally effective. The effective agent appears to be the potassium ion irrespective of the radical to which it is attached. Failure with potassium iodide is readily apparent, since the maximal daily dose of potassium iodide which may be tolerated by the average person contains only half the amount of potassium present in the minimal daily dose of potassium chloride or gluconate. Repeated serum potassium determinations of 27 of the 35 allergic patients during the course of therapy showed a relationship to exist between the average serum potassium variation after potassium therapy and the degree of relief obtained. Those persons experiencing the greatest relief showed the least rise. Failure of the serum potassium to rise after therapy suggests an effective increase in the concentration of tissue potassium.

Southern Surgeon, Atlanta, Ga.

9:775-852 (Nov.) 1940

Treatment of Malignant Tumors of Skin. G. T. Pack and W. O. Wuester, New York.—p. 775.
Miller-Abbott Tube for Intestinal Feeding. L. J. Hahn and A. H. Glick, New York.—p. 797.
Primary Pneumococcic Peritonitis in an Adult: Recovery Following Specific Serum Treatment. W. D. Owens, Miami Beach, Fla.—p. 804.
Pathology Causing Sciatic Syndrome. E. Walker, Atlanta, Ga.—p. 820.
Spinal Anesthesia: Observations After Ten Years' Experience; Report of More Than 7,000 Cases. M. J. Tendler, Memphis, Tenn.—p. 827.
Carcinoma of Descending Colon. T. A. Pressly, San Antonio, Texas.—p. 836.
Wound Healing. W. C. Tenery, Waxahachie, Texas.—p. 843.

Southwestern Medicine, El Paso, Texas

24:357-392 (Nov.) 1940

Carcinoma of Breast: Surgeon's Point of View. E. P. Palmer, Phoenix, Ariz.—p. 357.
Central Fractures of Neck of Femur: Treatment by Internal Fixation. W. C. Campbell and H. Smith, Memphis, Tenn.—p. 361.
Treatment of Perforated Gangrenous Appendix with Spreading Peritonitis. B. F. Stevens, El Paso, Texas.—p. 363.
Diagnosis and Treatment of Peptic Ulcer with Special Note on Gastroscopy. A. L. Levin, New Orleans.—p. 365.
Food Poisoning Due to Aerobacter Cloacae. R. A. Greene, Tucson, Ariz.; Z. B. Noon, Nogales, Ariz., and H. B. Harding, Tucson, Ariz. —p. 370.
Narcolepsy: Case Report. J. W. Myers, Albuquerque, N. M.—p. 372.

Virginia Medical Monthly, Richmond

67:717-776 (Dec.) 1940

Treatment of Pernicious Vomiting of Pregnancy. F. C. Irving, Boston. —p. 717.
Treatment of Acute Deliriums. K. M. Bowman, New York.—p. 724.
Classification of Commercial Preparations of Sex Hormones: II. W. G. Crockett, Richmond.—p. 732.
Hepatic Physiology. R. J. Main, Richmond.—p. 739.
Clinical Aspects of Jaundice. W. B. Martin, Norfolk.—p. 742.
Use of Sulfanilamide Powder in Open Wounds. M. Johnson Jr. and F. F. Davis, Roanoke.—p. 748.
Results of Treatment of Malignant Tumors of Larynx, Hypopharynx, Nasopharynx and Sinuses. F. D. Woodward and V. W. Archer, Charlottesville.—p. 751.
Treatment of Nausea and Vomiting of Pregnancy with Chloretone. E. M. Ellerson, Staunton.—p. 755.
Variability of Blood Pressure. E. A. Hines Jr., Rochester, Minn.—p. 757.
Induction of Ovulation. W. Bickers, Richmond.—p. 760.

West Virginia Medical Journal, Charleston

36:537-584 (Dec.) 1940

*Treatment of Pernicious Vomiting of Pregnancy. F. C. Irving, Boston. —p. 537.
Phrenico-Exeresis. F. J. Geraghty and T. B. Aycock, Baltimore.—p. 546.
*Arachnidism. F. C. Hodges, Huntington.—p. 550.
Suprapubic Transvesical Repair of Vesicovaginal Fistulas. G. G. Irwin, Charleston.—p. 553.
Treatment of Acute Deliriums. K. M. Bowman, New York.—p. 556.

Treatment of Pernicious Vomiting of Pregnancy.—Irving discusses the treatment of 225 consecutive patients with hyperemesis gravidarum encountered among 39,724 pregnant women admitted to the Boston Lying-In Hospital or in the outpatient department during a period of twelve years. Only 73 were patients registered for care in the clinic; the remainder were sent in as emergency cases and were generally from a higher economic stratum than those usually accepted at the clinic. Contrary to the usual opinion, 61.3 per cent of the patients had been pregnant before. This proportion agrees with the usual ratio of multigravidas, which is about 60 per cent of the total. Of the 138 multigravidas affected, 70 had vomited excessively in one or more previous pregnancies. The greatest number entered between the sixth and twelfth weeks of gestation. Contrary to the many attempts to link pernicious vomiting to preeclampsia, the author points out that not only do the two diseases occur at different periods of pregnancy but the general signs and symptoms of each in no way resemble one another; nor do the organs of fatal cases show the same changes. His patients with pernicious vomiting showed later in pregnancy no more tendency toward preeclampsia than did the others in the clinic; the ratio in their case was 1:22.5, and the general ratio 1:21. All pathologic reports show the hepatic change to be the same fatty degeneration that follows extreme starvation. The necrotic changes reported by earlier writers were not seen. A pulse rate of 110 or more always indicates a very sick patient. Peripheral neuritis is the most serious complication. Other complications are puerperal psychosis, pyelitis, pulmonary tuberculosis, hydatidiform mole, renal tuberculosis and acute appendicitis. For the mildly affected patients not requiring hospitalization, reassurance, a fat free diet rich in carbohydrates taken in small amounts six or seven times a day and a mild sedative usually suffices. For the seriously sick patient, hospital care under complete isolation from friends and family, including the husband, is necessary. The lower part of the intestine is emptied by enemas, and from 3 to 9 grains (0.2 to 0.6 Gm.) of pentobarbital sodium or any suitable barbiturate is given by rectum and repeated often enough to maintain the patient in a somnolent condition. Opiates are avoided, as they appear to increase vomiting. A hypodermoclysis of 1,500 cc. of physiologic solution of sodium chloride is then given and sufficient daily amounts are administered to maintain fluid balance. An intravenous drip of 5 or 10 per cent dextrose is given at 30 to 40 drops a minute and repeated at from eight to twelve hours. From January 1928 to January 1934, 110 patients were treated in this manner; 6 died and 19 were subjected to therapeutic abortion. As the pathologic changes of the patients who died were those of starvation, the Levine nasal tube as a method of forced feeding was used and improvement was at once apparent. Up to January 1940, 115 patients were treated in this way with no deaths and only three therapeutic abortions. At present in addition to the described regimen the Levine tube is passed and the stomach gently washed with warm water. A half hour later a rectal drip is started. From 4 to 6 ounces (120 to 180 Gm.) of milk containing 2 heaping teaspoons of Harris yeast concentrate is given by the Levine tube, followed in an hour by 4 to 6 ounces of orange juice sweetened with Karo corn syrup and one hour later by 6 ounces of a rich eggnog made with cream and egg, and one hour later by milk and the Harris yeast concentrate. This routine is repeated until fourteen out of twenty-five hours are completed. Each feeding requires about forty minutes and is given at body temperature. Thiamine hydrochloride, ascorbic acid and liver extract are given intramuscularly. If in spite of these measures there is a steadily rising pulse which remains above 110 or if the vomiting with jaundice is intractable the pregnancy should be interrupted. If twenty-four hours may be devoted to the process, the safest procedure is to pack the cervix and vagina firmly and the next day, after sufficient dilatation, to remove the ovum with a placental forceps and a dull curet. If such time cannot be taken, vaginal hysterotomy may be performed. Avertin with amylene hydrate, because of its effect on the liver, is interdicted. Sacral or low spinal anesthesia, if skilfully given, is perhaps the best of all.

Arachnidism.—Hodges reports the case of a woman in shock, complaining of excruciating general pains, most extreme in the back and next in the abdomen, who three hours previously, while lifting a board in the front yard, felt a sharp prick, like that of a needle, on the ring finger of her right hand. During the next two or three minutes a small white area appeared at the site of the initial pain; then her right arm began aching and the fingers of the right hand became red. Half an hour later there was aching in the right axilla and breast, following which her entire body, especially the lower part of her back, was seized with an excruciating, throbbing, aching pain with moderate headache. She became nauseated but did not vomit and noticed numbness with partial paralysis of both arms. When first seen by the author she was unable to stand alone, was perspiring freely and was in a state of apprehensive misery, pain and shock. One-fourth grain (0.015 Gm.) of morphine was injected and half an hour later, as most of the pain had disappeared, she was sent home. The following day at 2 p. m. she was reported to be much worse and was sent to the hospital, where 10 cc. of a 10 per cent solution of calcium gluconate was given intravenously. This was followed by marked relief from pain. The calcium gluconate was repeated the following morning and again gave some comfort. Feeling much improved on the afternoon of the second day, she returned to her home. She remained weak for five days, with an almost constant ache of her right arm, but complained of no discomfort in the bitten finger. Fifteen days after the bite she felt as well as ever in every respect. There was marked desquamation of the bitten finger. The premises were searched, and three black widow spiders were found. The author suggests that poisoning by the bite of a black widow spider be classified as a distinct medical entity. The frequency with which the black widow spider is found in the vicinity varies with one's interest. During a period of less than three weeks, more than twenty have been collected. The number of cases of arachnidism appears small considering the numbers and the distribution of the spider. Many unnecessary operations could be avoided if all physicians recognized that an acute condition with rigidity of the abdomen, mild fever, leukocytosis and occasionally nausea and vomiting may supervene as a result of the bite of the black widow spider.

FOREIGN

An asterisk (*) before a title indicates that the article is abstracted below. Single case reports and trials of new drugs are usually omitted.

British Medical Journal, London

2:583-618 (Nov. 2) 1940

Concentration and Drying of Plasma. F. X. Aylward, B. R. S. Mainwaring and J. F. Wilkinson.—p. 583.
*Dysmenorrhea and Sterility: Personality Studies. E. Wittkower and A. T. M. Wilson.—p. 586.
Traumatic Chylothorax. C. J. Cellan-Jones and W. Murphy.—p. 590.
Common Bile Duct Obstruction: Importance of Surgical Decompression. A. N. Canonico.—p. 591.
Bilateral Edema of Legs and Ankles Following Fixation of Chest for Fractured Ribs. B. Hirsh and R. Ellis.—p. 593.
Economy in Barium Meal Examinations. F. Roberts.—p. 602.
Control of Lice. P. A. Buxton.—p. 603.

Personality in Dysmenorrhea and Sterility.—Wittkower and Wilson made biographic studies of 57 unselected patients with primary dysmenorrhea, from 16 to 40 years of age, and of 30 sterile women from 21 to 45 years of age. The study concerned itself with family background, childhood characteristics, the reactions to various phases of adolescence and the adult personality. A group of 30 primigravidas who had never suffered from dysmenorrhea served as controls. The study shows that usually patients suffering from dysmenorrhea as children had often been either unusually aggressive and boisterous tomboys resenting their feminine role or ailing complaining children unwilling or unable to give up their childish dependence on their parents and possessing strong needs or cravings for sympathy and protection. Psychologic attitudes and allied emotional states may lead to increased interest and awareness of physiologic uterine functions or/and to an autonomic endocrine disturbance affecting uterine function. In the latter instance the pain might easily arise from relative ischemia disturbing the relation between the reciprocally innervated muscular contraction of body and cervix and the vasomotor state of the organ. The sterility patients, as in the case of dysmenorrhea, were even as children different from the control group of primigravidas of the same age who in childhood were well or fairly well adjusted individuals. Psychologically well adjusted types were found in great excess in the control group and only 2 of this type were observed in the sterility and dysmenorrhea groups. As children the dysmenorrhea group showed psychologic maladjustment four times as often as the control group. Of these maladjusted types the sterile group contained a high excess of ailing, timid, unsociable children, devoid of self assertion, while the dysmenorrhea group were usually boisterous and manifestly aggressive—obstinate, bad tempered or headstrong. As adults the dysmenorrhea patients were deeply resentful of their feminine role or obviously immature physically and either shy and shut in or chronically anxious and complaining. As adults the majority of sterile patients displayed unusual self centeredness in social and personal relations, clearly seen in a sexual frigidity, with abnormal reactions to coitus.

Lancet, London

2:507-536 (Oct. 26) 1940

*Blood Substitutes in Treatment of Acute Hemorrhage: Experimental Evaluation. G. A. H. Buttle, A. Kekwick and A. Schweitzer.—p. 507.
Nutritive Value of White Flour with Vitamin B1 Added and of Wholemeal Flour. Harriette Chick.—p. 511.
*Subacute Bacterial Endocarditis Treated with Sulfapyridine and Heparin. C. M. Fletcher.—p. 512.
Late Effects of Subdural Hemorrhage. E. A. Linell.—p. 514.
Axillary Embolectomy: Case. J. F. Hughes and P. Berry.—p. 516.
Brucella Melitensis in Cow's Milk. F. W. Duke.—p. 517.
Detection of Tuberculosis Among Recruits. G. G. Kayne.—p. 518.

Blood Substitutes for Acute Hemorrhage.—According to Buttle and his associates, storage of blood in banks has gone far to mitigate the delay involved in obtaining and bleeding donors, but, until blood can be stored for longer than a few weeks, blood banks will remain either wasteful or inadequate. There is need therefore for a blood substitute which can be stored for long periods, accumulated in large stocks and immediately available where casualties are likely to be received. The authors consider the therapeutic value of various blood substitutes. The therapeutic action of various blood substitutes has been compared, under standard experimental conditions, with those of whole blood, and the conclusion was reached that plasma is the only one which, in the cat, consistently gives results approximate to those obtained with whole blood. The authors place the other substitute solutions in the following descending order of value: serum, hemoglobin-Ringer, gum-saline, red cells in crystalloid solution, isotonic saline and isotonic dextrose. They conclude that filtration is the best method of overcoming the danger of plasma infection.

Sulfapyridine and Heparin for Bacterial Endocarditis.—Fletcher suggests that the encouraging results reported by Kelson and White in the treatment of subacute bacterial endocarditis with sulfapyridine and heparinization of the blood may lead to its further trial. The object of heparinization is to restrict further thrombotic deposition on the cardiac valves and to diminish the nidus and culture medium for bacterial growth, to prevent embolism from the freeing of fresh thrombus, and to check the growth of vegetations so that proliferating fibroblasts may fill in the area thus limited. At the same time, and for a week before and after the fourteen days of heparinization, sulfapyridine is given for its bacteriostatic action. The author describes a case of subacute bacterial endocarditis in which treatment with sulfapyridine and heparin was attempted, but the patient died from cerebral hemorrhage. To render the blood less coagulable in a disease in which emboli are common is to run the risk of serious hemorrhage. In many cases of infective endocarditis, however, administration of sulfapyridine temporarily sterilizes the blood stream and abolishes embolic accidents. Thus the week of therapy by sulfapyridine before starting the heparin acts as a safeguard against serious hemorrhage. In the reported case this safeguard failed, for a positive blood culture persisted and petechiae continued to appear while sulfapyridine was being given. Three other cases have been reported in which hemorrhage occurred during heparin treatment. Of the five other patients so far reported (all by Kelson and White) to have survived heparin treatment, only one had a positive blood culture at the beginning of the heparinization. In this case no improvement was obtained. The conclusion suggested by this small series is that the persistence of a positive blood culture, and in particular the continued appearance of embolic phenomena, should contraindicate heparin treatment. Swain, using in vitro tests in support of clinical observations, demonstrated that some strains of Streptococcus viridans are susceptible to sulfapyridine, while others are unaffected. He suggests that heparin treatment should be undertaken only when such tests show that the infecting strain of Streptococcus viridans is amenable to chemotherapy.

Medical Journal of Australia, Sydney

2:395-422 (Oct. 26) 1940

Sternal Puncture. J. A. McLean.—p. 395.
*Argentaffin Carcinomas ("Carcinoids") of Small Intestine. R. A. Willis.—p. 400.
Schick Reaction: Stabilized Toxin Compared with Toxin Diluted in Saline Solution. H. Wilson and N. E. Goldsworthy.—p. 403.
Some Surgical Pancreatic Diseases. T. M. Furber.—p. 405.

Argentaffin Carcinomas of Small Intestine.—Willis cites 6 cases of argentaffin carcinomas of the small intestine encountered during the last three years at the Alfred Hospital. Metastases developed in 4; in 2 it was widely disseminated blood-borne metastases which occasioned serious diagnostic errors. In another case a small primary growth was accompanied by a large, probably metastatic, growth in one kidney. The observations emphasize the fact that these tumors are highly malignant and show the falsity of the implication of innocence in Oberndorfer's name "carcinoid" tumor; the tumors are frank carcinomas, sometimes extremely malignant. In all 4 cases in which there were metastases the author observed that very small, often symptomless, primary tumors may produce bulky, clinically obtrusive metastases. Unless the intestine is opened and carefully examined at necropsy, the primary intestinal growths in many cases may easily escape discovery. He considers it possible that tumors found in the pancreas, biliary tract or stomach of subjects with multiple intestinal growths may not be metastases but multiple primary formations.

Presse Médicale, Paris

48:601-616 (July 24-27) 1940

*Resection of Aortic-Iliac Bifurcation with Bilateral Lumbar Sympathectomy in Thrombosis of the Aorta: Syndrome of Obliteration of Terminal Portion of Aorta Due to Arteritis. R. Leriche.—p. 601.
Clinical Study of Maladies in Melinite Factories. F. Trémolières, R. Goiffon and P.-E. Robert.—p. 604.

Resection of Aortic-Iliac Bifurcation in Aortic Thrombosis.—Leriche discusses the syndrome of aortic occlusion due to thrombosis and the bilateral lumbar sympathectomy that was combined with the resection. The pathologic process is characterized by five symptoms: loss of penile erection, which may have existed for a long time; extreme lassitude and fatigability of both lower extremities; complete atrophy of both lower extremities, nearly always present; pallor of the skin of the feet and legs, even in standing position, and assuming an ivory or marble appearance when the leg is raised, and absence of pulse in the leg and the femur. Neither the skin nor the nails indicate nutritional dysfunction. The toes have a good appearance. In the terminal phase there are found cyanosis of the feet and legs, desquamation of the skin, ulcer formations at pressure points, preceded by ecchymosis, and gangrene, accompanied by extreme pain. The diagnosis can be confirmed by arteriography. Leriche regards resection of the involved segment of the aorta and of the iliac arteries combined with bilateral lumber sympathectomy as the ideal treatment. He reports two carefully documented cases. In the first case the bilateral section involving the first lumbar ganglion was observed three and one half years later to have given good results. Here the occlusion amounted to from 2 to 3 cc. and was situated somewhat above the bifurcation. The patient (35 years old) was able to rise on the third day and was discharged on the tenth day. Blood pressure fell from 160 systolic and 110 diastolic to 120 systolic and 90 diastolic. The second patient, aged 61 years, was first seen when gangrene had already set in. The right foot and leg could be saved by the operation. The left foot was too far gone to be salvaged. No later observations could be made of the patient as he was lost sight of in the Strasbourg evacuation. The author believes that arterial thrombosis in the terminal section of the aorta above the inferior mesenteric artery occurs more frequently than is generally assumed. Diagnosis, which should be easy because of the clear symptoms and the slow evolution of the disease, frequently is at fault because of professional reluctance to accept the view that aortic thrombosis with bilateral iliac involvements can exist without mortification in the legs and feet. The delay in surgical intervention, however, due to hesitating or incorrect diagnosis, may necessitate partial amputation or induce a fatal termination with agonizing pains. He believes that aortic occlusion with simultaneous secondary involvement of the iliac arteries is the usual thing and not primary iliac occlusion without involvement of the aorta.

48:665-680 (Aug. 21-24) 1940

Role of the Kidneys in Tests for Induced Galactosuria. M. Chiray, H. Maschas and J. Germond.—p. 665.
*Treatment of Painful Amputated Stumps. E.-P. Leclerc.—p. 667.
Microdetermination in Serodiagnosis of Syphilis. R. Demanche.—p. 669.

Pain in Amputated Stumps.—Leclerc employed procaine hydrochloride, simple nerve resection and lumbar sympathectomy in treating pain in amputated stumps. Procaine hydrochloride, though only rarely affording permanent relief, is regarded by the author as valuable in indicating further therapy. For amputations of recent date and with localized pain, procaine hydrochloride gives good temporary results. In old and aggravated cases, in which the drug was unable to prevent recurrence of pain, satisfactory results were obtained by lumbar sympathectomy for the lower extremity and by ablation of the stellate ganglion for the upper extremity. In the mixed type of stump pains in which the remaining stump as well as the removed anatomic portion due to hyperesthesia was involved, favorable analgesic action of the drug indicated resection of the sympathetic chain and ganglions. If this operation was ineffective, a simple nerve resection followed by prompt suture or grafting did the job. This supplementary operation was not often necessary. An adequate interval of time, however, must then be allowed not only to avoid further damage to the patient but to gage the efficacy of the first operation. Lumbar sympathectomy, performed by the author in a limited number of cases, achieved remarkable results in relieving formication and vasomotor disorders. The author cites a remarkable case in which multiple operations had been performed for frozen feet since 1917. Seen in 1935, the patient was suffering agonizing pain. The stump indicated vasomotor and trophic dysfunction and presented a neuroma at the site of the cicatrix. Lumbar sympathectomy was done and all pain ceased on the evening of the same day, not to recur. Seen in 1939, the patient was well and had qualified as a gamekeeper, though before that he had been unable to endure any artificial apparatus. The author obtained better results by resection of the sympathetic chain and ganglions, done either as the first operation or in order to correct unsatisfactory previous results, than by all other therapeutic procedures, especially in the thoroughness with which the whole clinical picture was altered. This operation was the operation of choice whenever procaine hydrochloride was observed to alleviate pain. Simple nerve section for control of imaginary nostalgic pain in the severed limb, followed by prompt nerve reconstitution after using phenol at the central termination, was tried and abandoned for the method of choice. Periarterial sympathectomy, with the exception of 1 case, yielded only temporary relief. Early intervention offers the best result.

Gior. d. r. Accad. di Med. di Torino, Turin

103:37-122 (April-June) 1940. **Partial Index**

Sulfanilamide in Pneumonia. A. Allodi.—p. 80.
*Sulfanilamide in Herpes Zoster. G. Roasenda.—p. 112.

Sulfanilamide in Herpes Zoster.—Roasenda obtained satisfactory results with sulfanilamide in 3 cases of subacute and severe herpes zoster. The drug was administered in doses of 0.3 Gm. each three times a day in subacute cases, and at intervals of six hours in severe cases, for the first three days. Following this, two tablets of the same dose were given twice a day for a week. The patients received analgesic drugs for the control of pain and a mild hypnotic drug at retiring. In all cases pain abated, the spread of the lesions was arrested and fever abated and disappeared within the first three days of the treatment. The cutaneous lesions healed within the first week of the treatment even in cases of severe herpes with extensive lesions of gangrenous character.

Archivios de Pediatria del Uruguay, Montevideo

11:685-754 (Sept.) 1940. **Partial Index**

*Electrocardiogram in Diphtheria. M. R. Arana and R. Kreutzer.—p. 685.
Newly Born Infants and Nurslings. R. B. Yannicelli.—p. 705.

Electrocardiograms in Diphtheria.—Arana and Kreutzer report electrocardiographic studies on 621 children with diphtheria. Serious abnormalities of the first and second degrees were revealed in 257 cases, and moderate abnormalities in 321. Recovery from diphtheria took place in 42 of 43 patients with a normal heart, in 67 of 162 and in 79 of 95 patients with important electrocardiographic abnormalities of the first and second degrees respectively, and in 295 of 321 patients with moderate electrocardiographic abnormalities. The electrocardiogram became normal in 7 of 26 and in 8 of 16 patients with important abnormalities of the first and second degree and in 11 of 19 patients with moderate abnormalities. The observations were followed for from one to four years. Permanent electrocardiographic abnormalities of the first and second degree remained unchanged in 19 of the 26 and in 8 of 16 patients of the first and second groups, respectively, while permanent heart sequels of minor importance remained in 8 of the 19 patients of the third group. Observations were continued for less than three months in 41 cases of 67 and in 63 of 79 recovered patients of the first and second groups, and in 276 of the 295 recovered patients of the third group. The electrocardiograms exhibited a tendency to become normal in cases of mild heart lesions. There were 95 deaths among 162 cases, and 16 among 95 cases of the first and second groups, respectively, and 26 among 321 cases of the third group. The authors emphasize the importance of serial electrocardiograms in diphtheria. The disease may cause transient or permanent heart disease with electrocardio-

graphic abnormalities of any type. Certain types of diphtheritic heart disease are revealed by electrocardiography and not by clinical symptoms. Electrocardiograms have a prognostic significance. A normal heart indicates good prognosis except in malignant diphtheria. The milder the electrocardiographic alterations the better the outlook for recovery from diphtheria, and the more frequent the normalization of the electrocardiogram after recovery. The need of making electrocardiograms of patients before discharging them is obvious.

Prensa Médica Argentina, Buenos Aires

27:2187-2240 (Oct. 23) 1940. **Partial Index**

*Bilateral Spontaneous Pneumothorax. M. R. Castex and E. S. Mazzei. —p. 2187.
Arthritis Deformans of Knee Joint. A. A. Covaro.—p. 2203.

Bilateral Spontaneous Pneumothorax.—Castex and Mazzei review the literature on spontaneous bilateral pneumothorax and report a case of their own. Bilateral spontaneous pneumothorax is rare. It is not necessarily fatal. It occurs in adults, especially men. It may take place simultaneously in the two pleural cavities or several days or weeks apart. In either case the acuteness and the evolution of the condition depend on the pathogenic type of the pneumothorax which can be ascertained by the roentgen examination of the lung and pleuroscopy. The cicatricial, tuberculous and emphysematous pneumothoraces are the most frequent types. The so-called idiopathic pneumothorax which is cicatricial and is caused by rupture of air blebs in the subpleural cicatricial tissue is benign. The cicatricial pneumothorax from perforation of a scar of sclerotic pulmonary tissue follows a long evolution without fever and pleurisy. Frequently it causes moderate dyspnea because of intrapleural hypertension on one side. It is capable of improvement and of healing of the perforation with disappearance of the pneumothorax. Tuberculous and emphysematous pneumothoraces are serious. The prognosis must be cautious because of the ensuing cardiac and respiratory insufficiency. The treatment is symptomatic and is directed toward the control of the cough, dyspnea and pain. It consists in rest and of measures for the prevention of the cardiac and respiratory insufficiency. Oxygen therapy and removal of intrapleural air are indicated. In the case reported by the authors the perforation of a scar of sclerotic pulmonary tissue was visualized by pleuroscopy and was reproduced by pleurophotographs. It increased during inspiration. The patient was put on rest with symptomatic treatment. The intrapleural air was removed in amounts of from 800 to 3,000 cc. at each treatment at weekly intervals for about three months. The perforation healed spontaneously and the pneumothorax was absorbed.

Fortschritte der Therapie, Leipzig

16:227-266 (July) 1940

Multiple Sclerosis and Its Treatment. G. Voss.—p. 227.
*Chemotherapeutic Use of Methenamine in Virus Diseases. K.-H. Jaeger. —p. 231.
Blood Transfusion Utilizing a Modified Form of Heparin and an Infusor. J. Clemens.—p. 235.
Meningococcic Meningitis Treated with Meningococcus Serum and Sulfonamides. G. Perkuhn and H. E. Büttner.—p. 251.
Pertussis and Its Treatment. H. Lentze.—p. 254.

Methenamine in Virus Diseases.—Jaeger reports on the therapeutic effects of methenamine in herpes, erythema and varicella. The drug, given orally and by injection in relatively large daily doses totaling at least 6 to 8 Gm. in adults, was able to heal rapidly different types of herpes, such as herpes zoster and simplex. Cases of herpes simplex, with few exceptions, yielded at once to medication, irrespective of their site or etiology, whether due to infection, digestive disorders or the menstrual cycle. The drug was no less effective in erythema multiforme and erythema nodosum. In twenty cases of chickenpox the course of the disease was abbreviated and the appearance of the rash prevented in others. Mild hematuria that occasionally occurred under the impact of heavy doses could be promptly checked through discontinuation of the drug without sequels. The results observed led the author to assume that herpetic disorders owe their origin to the same cause as the varicellae whether this is a bacterial incitant or a substance; the clinical picture, however, in each case is determined by modifying factors. There may exist also a connection between herpetic diseases and the erythemas just mentioned. The specific therapeutic and prophylactic effects on varicella are due to the molecular action of the drug as a whole.

Khirurgiya, Moscow

1-160 (No. 8) 1939. **Partial Index**

*Intra-Arterial Blood Transfusion in Shock, Agony and Arrested Heart. I. A. Birillo.—p. 3.
Acidity of a Wound Irrigated with Solution of Iodine in Alcohol. V. V. Moscalenko.—p. 18.
Biochemical Changes in Muscles in Treatment of Fractures with Eggshell Preparations. G. A. Dudkevich.—p. 24.
Traumatic Lesions of Gastrointestinal Tract. V. D. Golovanov.—p. 29.
Operative Intra-Abdominal Interventions to Counteract Pain. N. N. Nazarov.—p. 37.
Local Anesthesia According to Vishnevskiy for Perforated Gastroduodenal Ulcers. S. I. Voronchikhin.—p. 43.

Intra-Arterial Blood Transfusion.—Birillo bled dogs to the extent varying from 69.7 to 88 per cent of the total blood volume. One minute after the complete arrest of the heart action and one-half minute after the cessation of respiration he began intra-arterial transfusion of fresh citrated blood. From 250 to 600 cc. was injected into the right carotid artery in the direction of the heart by means of a Riva-Rocci blood pressure apparatus combined with that of Bobrov. Epinephrine in the amount of 1 cc. of a 1:1,000 solution was also injected by piercing the connecting rubber tube with a fine needle attached to a syringe. Heart contractions commenced at once and the blood pressure began to rise after the introduction of the first 25 to 50 cc. of blood. Respirations returned soon after the reactivation of the heart. All eleven dogs survived the experiment. The author practiced intra-arterial blood transfusion from one-half to one minute after cessation of heart action induced by chloroform narcosis. Following the transfusion the author bled the dog by way of one or both jugular veins in order to relieve the right side of the heart. All the dogs were resuscitated. The success of the experiment depended, in the author's opinion, on the fact that blood and epinephrine found their way immediately into the coronary arteries and the general arterial tree. Next, the author experimented with a series of 9 dogs in a state of shock with blood pressure varying from 60 mm. of mercury to 0. Intra-arterial injections of citrated blood in the amounts of from 250 to 380 cc. revived all the animals. In another series of 9 dogs a similar experiment was carried out, the intravenous route being substituted for the transfusion of blood with epinephrine. All the animals perished except 2, in which the author resorted, after failure with the intravenous method, to intra-arterial transfusion. Birillo applied the method to 4 clinical patients in the agonal state and was able to revive them for four to twenty-four hours. Citrated blood was introduced into either the ulnar or the radial artery. All the patients died, however, because of destructive and irreversible lesions in vital organs. The author believes that the method of intra-arterial blood transfusion may find application in patients dying of some acute process but possessing a normal cardiovascular system. Active bleeding constitutes a contraindication.

Nordisk Medicin, Gothenburg

7:1527-1566 (Sept. 14) 1940. **Partial Index**

Norsk Magasin for Lægevidenskapen

*Cause, Treatment and Prevention of Tendency to Bleeding in Newborn. K. K. Nygaard.—p. 1535.
Case of Synovialoma in Hip Joint Region. E. Schie.—p. 1538.
Acute Encephalitis—Especially Prognosis. K. Motzfeldt.—p. 1541.

Bleeding in Newborn.—Nygaard considers inactivity of the intestinal flora in the newborn as probably only one of the factors concerned in the transitory hypoprothrombinemia which develops in the first days after birth. He is inclined to believe that vitamin K has its greatest possibility not in therapy but in prophylaxis of the tendency to bleeding which occurs when the prothrombin reaches a certain low level and says that the most satisfactory results seem to be attained by the administration of vitamin K to the mother before birth. With the synthetic preparation 2-methyl-1:4-naphtokinon a dose of 1 tablet (10 mg.) daily may be given for one or two weeks before birth; as a rule the dose must apparently be increased the more immediately before birth the vitamin is given. He noted no toxic symptoms in mother or child.

Book Notices

Organization, Strategy and Tactics of the Army Medical Services in War. By Lieut.-Colonel T. R. Nicholls, M.B., Ch.B., Medical Officer, A. R. P., Derbyshire County. With Chapters by Air-Commodore A. S. Glynn, M.B., Ch.B., K.H.S., Fighter Command, R. A. F., Colonel A. R. Laurie, M.B., Ch.B., D.M.R.E.(T.A.), 2nd Anti-Aircraft Division, and Colonel F. G. Lescher, M.C., M.A., M.D., Group Officer, E. M. S. Second edition. Cloth. Price, $5. Pp. 488. Baltimore: Williams & Wilkins Company; London: Baillière, Tindall & Cox, 1940.

The medical service in war is a large organization which has the duties not only of treating the wounded and sick but of providing for them food, clothing, warmth, discipline, pay and transportation of enormous numbers. Medical skill is required to keep the troops fit and healthy, and a high degree of administrative ability is necessary to supply and coordinate the various forms of transport—ambulances, stretcher bearers, trains, ships, barges—and to provide vast quantities of dressings, drugs, instruments, splints and all sorts of appliances. In the last World War, some eleven million sick and wounded from all parts of the world suffered from every conceivable injury and sickness. This tremendous duty was performed so well that 75 per cent of these eleven million sufferers were restored to their health and duties. The author, a retired officer of the Royal Army Medical Corps, during the World War commanded almost every kind of medical unit in the field on active service. His book is based on wide personal experience and on five years of labor since then performed to provide a book which deals with every problem that a medical officer in the field may have to solve. Heretofore British medical officers had to study many books of reference, while some necessary information could not be obtained from any printed source. The author has brought this information together in one volume. The fact that a second edition was necessary in less than four years indicates that the book is serving its purpose. The general organization of the medical services and the constitution of the medical units are those of the British army. Nevertheless, the general principles of those considerations, as well as those of strategy and tactics, are similar in all large military medical services. In addition to questions of supply and tables of organization are instructions about how to maintain supplies in quantity and in good condition; also discussions of personnel and organization of general hospitals, base hospitals, hospital trains, hospital ships, antiaircraft medical services, transport of casualties by air, collecting post, dressing stations and regimental units. There is also a series of tactical problems and exercises for study in connection with examinations for promotion. The book covers a wide scope and fills a long-felt need.

The Surgery of the Alimentary Tract. By Sir Hugh Devine, M.S., F.R.A.C.S., F.A.C.S., President, Royal Australasian College of Surgeons, Melbourne. Cloth. Price, $15. Pp. 1,046, with 690 illustrations. Baltimore: William Wood & Company, 1940.

Surgery of the alimentary tract is a modern development. Its span is not more than a half century and many of the more recent procedures have not received proper evaluation. The inherent difficulty in the diagnosis of gastrointestinal lesions is reflected by a similar difficulty in assessing the surgical treatment. As the author states, the ability to evaluate the symptoms and signs presented by the patient is a full responsibility of every surgeon professing to treat gastrointestinal diseases. Further, a study of the history of alimentary tract diseases reveals that the greatest contributions to their diagnosis and correlation with pathologic changes must be credited to the science of surgery. It is proper, therefore, for any comprehensive surgical work to include discussion of what is ordinarily considered "medical" gastro-enterology.

In light of this the author begins with a discussion of the dyspepsias. One who has had as much experience as Devine no doubt has accumulated considerable wisdom and insight, inexpressible as these might be, regarding that vague entity dyspepsia. Accordingly he has divided the dyspepsias into two groups, medical and surgical. One of the more important distinctions between these is pain. Almost immediately, however, exceptions to this rule are made. Such a separation is a dangerous concept. Dyspepsia, or indigestion, especially in the elderly, is an important signal not to be lightly disregarded. Investigation and not contemplation is indicated as soon as possible. Medical dyspepsia, or functional indigestion, should always be a diagnosis made with reservations. The author proceeds to illustrate this fact aptly, although he has not emphasized it sufficiently. However, the various dyspepsias (better dyspeptic symptoms) associated with organic diseases are well presented. Diagnostic efforts such as x-ray examination and gastroscopy are discussed sufficiently for the surgeon. The diagnosis of appendical dyspepsia by roentgenologic methods is not widely accepted in this country.

The portrayal of surgical procedures is extremely interesting. The author relies on a number of mechanical aids and self-retaining retractors. While in his hands undoubtedly these work well, in this country well equipped hospitals with enough trained assistants are available for private as well as public patients. Of course, the Devine exclusion operation is presented. Any surgeon, however, who undertakes to treat peptic ulcer by excluding rather than removing the pylorus and antrum assumes a grave responsibility. Especially good are the sections on hydatid disease, with which the Australians have much more experience. Other topics dealt with are biliary diseases, appendicitis, intestinal obstruction and other intestinal diseases amenable to surgical treatment. These subjects are presented uniformly well. No mention is made of the use of vitamin K in the prevention and treatment of hemorrhage in the presence of jaundice. The problem of fluid balance and decompression in intestinal obstruction is not adequately discussed. This is important, because in spite of the newer methods of treatment great reduction in mortality has not resulted. The illustrations are good, and in spite of some serious omissions the text represents much that is good common sense. The surgeon concerned with diseases of the alimentary tract can profit by perusal of this volume.

La sénescence et le rajeunissement. Par le Docteur Paul Niehans, chirurgien et urologiste F. M. H. à la Clinique de Clarens et aux hôpitaux de Vevey et de Montreux (Suisse). Traduction libre de l'allemand. Paper. Pp. 72. Paris: Vigot Frères, 1937.

The author discusses senescence and rejuvenation and goes into details on how to avoid the former and effect the latter. He analyzes the problem of senescence, of extinction of life and of final death. He recalls that growth and maturity, cicatrization, cure and regeneration, even sensation and perception, are manifestations of cellular interactivity. Senescence begins in the cell and ends in death, which is nothing else but the disintegration of the edifice formed by the cells. Protozoans know neither old age nor death. Under suitable surroundings they are capable of indefinite reproduction. Each individual protozoan achieves its existence by fission. Metazoa know neither senescence nor death. The life of certain of these organisms may be without limit (jellyfish, corals, hydras and hydroid polyps). Certain cells can survive the death of the organism for long periods. Thus a mouse may live for two months, but the cells of its tegument or of one of its organs can continue to live ten years or more, if placed in a favorable culture medium (Carrel). Physiologic senescence begins in the human female at the menopause. Graafian follicles cease to rupture and the organism does not receive its monthly supply of follicular hormones. In man senescence begins in the fifth decade of life. The testicles become smaller. Endocrinologists attribute old age to secretory disturbances of the sexual glands. Stock raisers know that castration shortens life. Other endocrine glands, like the testes, also have their epoch of activity and of decline. The testicle, like the pancreas, is a double gland. Leydig, Sertoli and Steinach's F cells are discussed at length. "Is it possible to retard senescence?" the author asks and replies that the answer lies in the different measures employed to effect rejuvenation. He then gives a long list of methods that are now in use, hygienic, dietetic, organotherapeutic. He describes various operative measures that have been employed and compares their degree of efficacy, including albugenectomy—linear, cruciform and circular. Albugenotomy develops Leydig cells and not the Sertoli cells, which are more specific for rejuvenation, he points out. Transplantation of the various glands—anterior lobe of the hypophysis, thymus, thyroid, the cortex of the adrenals, of the placenta, of the sexual glands—is also described. In the lower animals, it is claimed, transplantation of the sexual

glands increases wool production, prolongs life and rejuvenates reproducing bulls and bucks. The author describes the Steinach technics and quotes Steinach's belief that the processes of cellular senescence are reversible, within certain limits, by hormonal impulsion.

A Treatise on Medicolegal Ophthalmology. By Albert C. Snell, M.D., Ophthalmologist, Park Avenue Hospital, Rochester, New York. Cloth. Price, $6. Pp. 312, with 15 illustrations. St. Louis: C. V. Mosby Company, 1940.

This is the first American textbook devoted to forensic ophthalmology, although thirty-eight years ago Würdemann translated and published a book on Visual Economics. The first part of the book contains some essential principles of medical jurisprudence, stripped of their legal verbiage and stated in terms that can be comprehended by the medical man. It is commended most earnestly not only to the ophthalmologist but to all practitioners of the art of medicine as well. A careful study of the first ninety-five pages can save future legal embarrassment. The second part is given to the evaluation of visual disabilities and analyses of the basic principles involved in the act of seeing. Not only is there a careful psychologic study of visual acuity and all that it implies but there is also an equally careful study of the fractional parts of vision, as the visual field, muscle function and coordinate action. This is good reading for every ophthalmologist, whether or not he ever has to appear in court or before a compensation board. Mathematical evaluations which were prepared with the help of Mr. Scott Sterling are reduced to their simplest terms, so that a knowledge of higher mathematics is not essential. The third part deals with the practical application of the visual efficiency computation to medicolegal practice, with particular emphasis on the evaluation of visual disabilities. The author is chairman of the committee of the Section on Ophthalmology of the American Medical Association on compensation for eye injuries. The report of this committee, which was adopted some fourteen years ago, is now undergoing revision and will be presented at the 1941 session of the Association. The whys and wherefores of the report and its revision are explained in great detail in the last pages. This book is a real necessity for every modern ophthalmologist.

Child Psychology for Professional Workers. By Florence M. Teagarden, Ph.D., Professor of Psychology, University of Pittsburgh, Pittsburgh. Cloth. Price, $3.25. Pp. 641, with 9 illustrations. New York: Prentice-Hall, Inc., 1940.

While there have been many other textbooks written on the subject of child psychology, this is the first definitely directed toward aiding the social worker, physician and psychiatrist in evaluating the various points of information given in taking a history in a problem case. While most of the information given in the book describes the behavior of normal children, there is enough of the description of behavior problems and pathologic youngsters, and those having emotional conflicts, to be greatly revealing. The amount of systematic material collected between two covers which could be used to aid the social worker in finding out the meaning of the various traits has been extremely limited. While every trained worker in the field and, of course, the trained pediatrician and child psychiatrist have learned by bitter experience or perusal of the literature what the effect, for instance, of crippling might be, there has been no other treatise which covers not only the mental result of crippling but what also must be expected of the normal noncrippled child at the same developmental level. The book is so all inclusive that it is impossible to give a complete summary of the contents, but parts of it must be stressed. First, the book begins with a sensible discussion of the meaning of heredity as far as child development is concerned. The next chapters deal with infancy, the preschool child and the usual physical habits found in these children, including toilet habits and difficulties encountered in toilet training. The child in its home and away from home is discussed from the point of view of the emotional meanings of the home and the foster home. There is also a complete chapter on adoption which covers the subject in a comprehensive and simple way. The child's emotions, sex life, intelligence, school reactions and behavior difficulties are all made the subjects of chapters. Most important to the physician is the chapter on the psychologic and social problems incident to diseases of childhood. The author, to complete her volume, included chapters dealing with the auditory and visual handicaps and speech defects which perhaps bring children most often to the physician. The pediatrician must of necessity profit by a book of this sort, for it will spare him the effort of going through a mass of uncorrelated literature to aid him in supplementing his own knowledge of specific subjects. There are comprehensive bibliographies at the chapter ends. All in all, the book is excellent. While much of the discussion of problem material rests on a hypothetic basis, the hypothesis is usually the one most accepted by psychiatrists and orthopsychiatrists, although the author herself is a psychologist.

"Breathing Machines" and Their Use in Treatment: Report of the Respirators (Poliomyelitis) Committee. Medical Research Council, Special Report Series, No. 237. Paper. Price, 60 cents; 2s. Pp. 90, with illustrations. New York: British Library of Information; London: His Majesty's Stationery Office, 1940.

A description (nineteen pages) of the various types of respirators now available in Great Britain is followed by a discussion of the clinical experience (sixteen pages) in their use. The incidence of respiratory paralysis from all causes in Britain is given some attention and is followed by a treatise on indications for use of the machines, with their management and the nursing technic involved. The choice and location of apparatus have a place in the report but necessarily are applicable only to Great Britain. The conclusions are especially well written. The authors emphasize that the machines are needed only for prolonged administration of artificial respiration and that they in no way displace the use of manual methods for emergency rescue work. It is suggested that machines be placed strategically in hospitals and the patients brought there, rather than to have the machines taken to the patients. The appendix contains twenty pages of tables showing where machines have been used, the cause of the respiratory failure, and the outcome of the treatment.

American readers are naturally most interested in what we may apply from this study to our own problem. Since this report appeared, the National Foundation for Infantile Paralysis, 120 Broadway, New York, has issued two pamphlets, one by Dr. J. L. Wilson of Detroit, giving probably the best discussion which has yet appeared on the use of respirators and the care of the patient, and a second showing the location of the respirators in the United States. The greater density of population and the smaller distances in England, as compared with the United States, make the British respirator problem quite different from ours. It is doubtful whether that phase of their study will help us, but their analyses of cases of diphtheria and poliomyelitis treated are informative. Although we have far more data from which to draw, we have made no such analyses of our cases treated.

Holt's Diseases of Infancy and Childhood: A Textbook for the Use of Students and Practitioners. By the late L. Emmett Holt, M.D., and John Howland, M.D. Revised by L. Emmett Holt Jr., M.D., Associate Professor of Pediatrics, Johns Hopkins University, Baltimore, and Rustin McIntosh, M.D., Carpentier Professor of Pediatrics, Columbia University, New York. Eleventh edition. Cloth. Price, $10. Pp. 1,431, with 262 illustrations. New York & London: D. Appleton-Century Company, Inc., 1940.

The last previous edition was published in 1934. The present edition appears with a long list of collaborators and represents great changes from the original textbook by Holt or even the revision by Howland. In the present edition, large parts have been entirely rewritten. The entire section devoted to diseases of the eye has been added. Much new material appears on the endocrine disorders. There have also been extensive changes in the discussions of many diseases. Most of the collaborators are from the faculties of Johns Hopkins University School of Medicine and from Columbia University, but there are also some contributions by physicians from other schools. The bibliographies have been brought up to the present. The authors have taken advantage of many of the studies promoted through governmental agencies. The chapters on the use of the sulfonamide derivatives in children give proper consideration to the question of dosages of these agents. Typical of the up-to-date character of the revision is the late material concerning vitamin K and the so-called vitamin P. Altogether, the work on this volume has been so thorough that it may be recommended not only as a textbook for students but also as a constant desk reference for the practicing physician.

How Life Began: A Speculative Study in Modern Biology. By David Forsyth, M.D., D.Sc., F.R.C.P., Consulting Physician, Charing Cross Hospital, London. Cloth. Price, 5s. Pp. 106. London: William Heinemann, Ltd., 1939.

The author calls this a speculative study in modern biology. It is that and more in that it attempts to answer the age old query "Why is man?" rather than give information on "What is man?" Beginning with the biology of man, the book discusses heredity and environment. It does not advance solid arguments for one to the detriment of the other but shows how the two are related. The author shows further that the two cannot be kept in separate compartments but must be invoked together. He speaks of an "inherited environment" and shows further that the two overlap "spatially and structurally" to such an extent that it is quite impracticable to decide where one "leaves off and the other begins." The book is thought provoking, makes excellent reading and will interest the physician and those of his patients who possess a sufficient background of knowledge in biology.

The Neuroses in War. By Several Authors under the Editorship of Emanuel Miller, M.A., M.R.C.P., D.P.M. With a concluding chapter by H. Crichton-Miller, M.D., F.R.C.P. Cloth. Price, $2.50. Pp. 250. New York: Macmillan Company, 1940.

British neurology of the last war was subjected to some criticism in this country for not having taken full advantage of the opportunities presented to study the so-called functional nervous disorders. Without considering the justice of that criticism, this book demonstrates that in this conflict much thought has already been given to the subject of war-caused or war-precipitated neuroses and that the British medical services are prepared to give better service and more careful study to the subject than was done in the last war. There are twelve contributors to this book. One of them, unnamed, is a staff officer attached to the Royal Army Medical Corps. The discussions in general show careful preparation and constitute good reviews of the present status of knowledge in the field. Unfortunately it appears that an extensive opportunity will be given to expand the knowledge of the war neuroses in the civil as well as the military population. The book deserves careful study in this country both for the light which it can shed on the war neuroses and for the assistance which it can offer in civil life and possibly in the work of the draft boards.

Essentials of College Chemistry. By G. H. Whiteford, Ph.D., Professor of Chemistry, and R. G. Coffin, M.S., Associate Professor of Chemistry, Colorado State College, Fort Collins, Colorado. Second edition. Cloth. Price, $4. Pp. 534, with 32 illustrations. St. Louis: C. V. Mosby Company, 1939.

The first edition of this volume was reviewed in THE JOURNAL, Jan. 29, 1938. Many sections of the present edition have been revised and a new brief chapter on some carbon compounds essential to life processes has been added. The authors have continued the presentation of the fundamentals of chemistry in a style which is clear but necessarily limited. An interesting feature of the new edition—one of great value to the beginning student—is the inclusion of a few pertinent references to modern books and periodical chemical literature at the end of many of the chapters. These references direct the student's attention to more complete reviews of the subjects covered generally in the text. Thus they serve to stimulate, interest and acquaint the student with the useful habit of perusing the current literature as an aid to success in his chosen field of effort. Another feature of this edition is the faint green tint of the lightly glazed paper on which it is printed. The publishers have thus directly attempted to aid the reduction of eye fatigue in those students who find it necessary to read the text intensively.

Pathological Conferences Held at the Cook County Hospital. By Dr. R. H. Jaffé. Edited by Chester C. Guy, M.D. Cloth. Price, $3.50. Pp. 1,164. Chicago: Cook County Hospital Internes' Alumni Association, 1940.

This is a memorial volume which preserves from oblivion a portion of Dr. Richard H. Jaffé's contributions to clinical pathology which otherwise would be lost. The titles of 119 articles on various subjects represent his more formal contributions to the science of medicine. The volume comprises 596 cases presented at the weekly pathologic conferences of Cook County Hospital during the decade 1928-1937. A summary of the history of each patient is given and then the clinical and laboratory data followed by the results of the necropsy and comments. This method of approach presents two views of each disease—binocular vision, so to speak. The cases presented range from such unusual conditions as Hodgkin's disease of the brain, Ayerza's disease and Cushing's syndrome to a wide assortment of the more common clinical conditions. If this collection includes all those used for teaching purposes in the conferences, the solitary case of typhoid is eloquent proof of the altered occurrence of that disease since the days when the reviewer attended necropsies in Cook County Hospital. More than 200 of the cases represent leukemic and neoplastic diseases. The arrangement of the index both for diseases and for organs adds to its usefulness. Detailed minutiae of technical and morphologic considerations are omitted from the analyses in general. The pertinent facts and discussions are presented concisely. One reads with admiration the briefly detailed description of a primary malignant glomus tumor of the omentum and the elucidation of the origin and significance of glomera. The printed page does not adequately transmit personality; yet even so, those who knew Dr. Jaffé as a teacher and demonstrator of pathology will find his personal characteristics as well as his comprehensive knowledge reflected here.

A Textbook of Anatomy and Physiology. By Jesse Feiring Williams, M.D., Sc.D., Professor of Physical Education, Teachers College, Columbia University, New York City. Sixth edition. Cloth. Price, $2.75. Pp. 607, with 367 illustrations. Philadelphia & London: W. B. Saunders Company, 1939.

This book has been revised, and more illustrations have been added. It departs from the usual method of presenting anatomy separate from physiology. It is intended for students in nursing schools and professional students in various fields of education, especially physical education. The suggestions on how to study as well as the practical exercises and questions given at the end of each chapter should prove valuable to the student.

Statistical Methods Applied to Experiments in Agriculture and Biology. By George W. Snedecor, Director of the Statistical Laboratory of Iowa State College, Ames. Third edition. Fabrikoid. Price, $3.75. Pp. 422, with illustrations. Ames: Iowa State College Press, 1940.

This edition appears only two years after the second. Some material has been added to the chapters on linear regression and large samples of enumeration data, while an additional chapter has been written to incorporate methods useful in some of the broader fields of sampling. Physicians without a considerable knowledge of higher mathematics will not find this book easy, but those who are advanced in the study of statistical methods may obtain much valuable information.

The Psychological Aspects of Pediatric Practice. By Benjamin Spock, M.D., and Mabel Huschka, M.D. [Reproduced from the Practitioners Library of Medicine and Surgery, Vol. XIII, pp. 757-808, by the New York State Committee on Mental Hygiene, Courtesy of the D. Appleton-Century Company.] Paper. Price, 25 cents. New York.

This reprint is an interesting summary useful perhaps for the pediatrician, which explains the attitudes and interests of children, particularly babies, toward feeding problems, weaning, thumb sucking, nail biting, constipation, enuresis, anxiety, temper tantrums, discipline, training and spoiling, masturbation, fears, phobias and night terrors and similar subjects. The matters are dealt with briefly from sound common sense to the scientific point of view.

Child Care and Training. By Marion L. Faegre, Assistant Professor of Parent Education, and John E. Anderson, Director, Institute of Child Welfare, University of Minnesota. Fifth edition revised. Cloth. Price, $2.50. Pp. 320, with 23 illustrations. Minneapolis: University of Minnesota Press, 1940.

This edition has been completely checked and brought down to date. The fundamental plan and information of earlier editions has been maintained. Every phase of the child's life from a year through high school is discussed clearly and concisely. Ample illustrations, references and suggestions accompany each topic. The chapters on habits, on imagination, truth and falsehood and on books and reading are especially interesting. Parents, teachers, students, doctors and others working with or interested in children have for many years valued and will continue to value this book and find it interesting, highly informative reading.

Queries and Minor Notes

THE ANSWERS HERE PUBLISHED HAVE BEEN PREPARED BY COMPETENT AUTHORITIES. THEY DO NOT, HOWEVER, REPRESENT THE OPINIONS OF ANY OFFICIAL BODIES UNLESS SPECIFICALLY STATED IN THE REPLY. ANONYMOUS COMMUNICATIONS AND QUERIES ON POSTAL CARDS WILL NOT BE NOTICED. EVERY LETTER MUST CONTAIN THE WRITER'S NAME AND ADDRESS, BUT THESE WILL BE OMITTED ON REQUEST.

TREATMENT OF EPIDEMIC INFLUENZA

To the Editor:—I should like your advice on the best known modern treatment for influenza.

William B. Bruns, M.D., Columbia, Mo.

ANSWER.—There is no specific treatment for true epidemic influenza. Modern therapy is of necessity still symptomatic. It places a special emphasis on two points: rest in bed and good nursing care. The patient should be put to bed as early as possible after onset of the disease and kept there until convalescence is well established. The object of good nursing is to promote the comfort of the patient and to preserve his strength. The diet during the acute stage should be liquid, given at frequent intervals and not to exceed 3,000 cc. A small enema on the second or third day is preferred to purgation by cathartics. Headache and body pains are combated by judicious and restricted use of analgesics and sedatives, among which salicylates and codeine are probably most useful. The irritating cough is treated by keeping the air of the sick room moist, by inhalation of compound tincture of benzoin in steam and by expectorant and sedative drugs.

It has been established that Haemophilus influenzae (Pfeiffer's bacillus) is not the cause of the disease but that a virus and probably at least two strains cause epidemic influenza.

GROWTH OF TISSUES AFTER DEATH

To the Editor:—Dr. James Ewing (in Legal Medicine and Toxicology, Ed. 2, Vol. 1, edited by Peterson, Haines and Webster, Philadelphia, W. B. Saunders Company, 1923, p. 175) states that the hair and finger nails may continue to grow after death. The same statement is repeated by Webster (in Legal Med. and Toxicology, Philadelphia, W. B. Saunders Company, 1930, chapter 4, p. 71). On the other hand, in Legal Medicine and Toxicology by Gonzales, Vance and Helpern (New York, D. Appleton Company, 1937, chapter 5, p. 64) the statement is made that such "growth does not continue after death as claimed by popular superstition." With such authorities at variance I would deeply appreciate the opinion of a referee.

M.D., California.

ANSWER.—Somatic death, or death of the body as an organism, occurs with cessation of the functions of the vital centers —the heart, lungs and brain. Molecular death, or death of the tissue cells, which goes on constantly during life incidental to the breaking down and building up of tissues, may not become complete at the time of somatic death but may be delayed until later. It is reasonable to believe that molecular life may continue after somatic death but for only a comparatively short time, because the oxygen cycle has been stopped. In fact, tissues such as skin and bone from the bodies of persons recently dead have been transplanted successfully to living persons. In the opinion of Sydney Smith (Forensic Medicine, ed. 4, London, J. & A. Churchill, Ltd., 1934, chapter 2, pp. 16-17) the period between somatic death and complete molecular death of the body tissues, while of considerable duration in such animals as frogs and eels, is in man rarely more than three or four hours.

According to popular superstition the hair and nails continue to grow after death. These tissues are highly resistant to decomposition, but medicolegal authors are divided as to whether or not growth of such structures actually occurs after somatic death. According to James Ewing (in Legal Medicine and Toxicology by Many Specialists, ed. 2, edited by Peterson, Haines and Webster, Philadelphia, W. B. Saunders Company, 1923, vol. 1, p. 175) and Ralph W. Webster (Legal Medicine and Toxicology, Philadelphia, W. B. Saunders Company, 1930, chapter 4, p. 71) growth of hair and nails continues for some time after somatic death. Irving C. Rosse (in Medical Jurisprudence, Forensic Medicine and Toxicology, edited by Witthaus and Becker, New York, William Wood & Co., 1894, vol. 1, pp. 406-407) also states that it is believed that hair and nails grow after somatic death. He refers to a case reported by Dr. Caldwell of Iowa in the *New York Medical Record* (Aug. 18, 1877). Dr. Caldwell claimed that he was present in 1862 at the exhumation of a body which had been buried for four years; that hair protruded through openings in the coffin where the joints had separated and that although the deceased had reputedly been shaved before burial the hair of the head measured 18 inches, the beard 8 inches and the hair of the breast from 4 to 6 inches. Rosse also refers to a case in Washington, D. C., in which the body of a young girl, supposed to have been 12 or 13 years of age at the time of her death, was exhumed and "a number of persons noticed . . . that her hair had grown until it extended from her crown to her feet." But, according to the weight of authority and what appears to be the correct view, growth of hair and nails in a dead human body does not occur to any measurable degree after somatic death (Gonzales, Thomas A.; Vance, Morgan, and Helpern, Milton: Legal Medicine and Toxicology, New York, D. Appleton-Century Company, 1937, chapter 5, p. 64. Taylor's Principles and Practice of Medical Jurisprudence, ed. 9, edited by Sydney Smith, with revision of legal aspect by W. G. H. Cook, London, J. & A. Churchill, Ltd., 1934, vol. 1, pp. 144-145. Draper, Frank Winthrop: A Text-Book of Legal Medicine, Philadelphia, W. B. Saunders Company, 1905, chapter 5, p. 88). The shrinking of the skin and soft tissues after somatic death may, however, lead to extrusion of hair above the surface of the skin and thus simulate growth after death. Hence from twenty-four to forty-eight hours after death the hair on the face of a cadaver may project more above the surface of the skin than it did at the time of death. Likewise the shrinking of the skin and soft tissues after death may also cause the nails to appear longer.

DARK ADAPTATION AND NIGHT VISION OF AVIATORS

To the Editor:—I am greatly interested in what may come out of the vague reports we begin to hear in the United States of the trial of British airmen who can see better in the dark than normal persons (hemeralopia) in the desperate night defense of London. From the time of Hippocrates and Galen, there have been among soldiers and sailors cases of so-called hemeralopia or seeing better in the dark. Always, however, there has been some ambiguity as to both proper title and etiology. Aristotle seems to have had an appreciation of its nature when he applied the name of "night fox" to those who, like foxes and other beasts or birds of prey, could see better in the dark. Now it remains, apparently, as one of England's dire necessities to try out airmen possessed of this odd quality of the sense of sight. Perhaps no tale of John Verne, the Arabian Nights or Swift could surpass in imagination the flight of a possible modern "night hawk" darting from cloud to cloud yet picking out his enemy's plane in the blackness of the night. How much of this are we to believe? Certain it is that a few returning travelers from England who have talked with some of the high command in British aviation speak of the actual trial of gunmen and even pilots who possess this peculiar but rare quality of seeing much better in the night than do normal persons. That a small number of such men can be found among many thousands of soldiers is unquestionably true. It remains, however, another matter entirely to put such a peculiar perception to practical use in meeting a German night air blitzkrieg. The ability to see larger objects better in darkness or dusk, rather than in a bright light, called hemeralopia is apparently a form of so-called day blindness and needs to be studied from many angles. It occurs not only in certain chronic conditions of the retina and optic nerve but also in persons long excluded from the light and in some with congenital anomalies. Just why a few persons should be born with this tendency is not fully understood, nor can the causes as yet be readily classified. In my eye examinations of recruits of the first World War coming before me as a member of the Dubuque Draft Board of 1917-1918, I recall but 1 definite case; the particular man could not be accepted for army duty at all because of other defects. On another occasion I took considerable time in studying the same condition in a chauffeur in Chicago. This man had served in the South African Boer war and was well known in the regiment for his night ability to see far in the dark. For the exercise of this function he had often been stationed at important outposts of the camp during the night. The condition of the fundus of the eye at the time was diagnosed as retinitis striata. Similar reports reach physicians of certain fishermen or hunters who in this respect are the envy of their companions. So-called day blindness or hemeralopia is to be differentiated from the opposite condition, called nyctalopia or night blindness, and seems to be much more common in men than in women. Whether an advantage can be expected from men who can see an enemy's plane in the dark rather than from an air instrument that locates it more blindly may prove of more than academic value by the time Europe's second World War is over.

Henry G. Langworthy, M.D., Dubuque, Iowa.

ANSWER.—Ability to see in reduced illumination depends partly on the function of dark adaptation, by which the chemical substance which is necessary for function of the retinal rods is regenerated. A number of persons have this function reduced below normal from various causes, among which are vitamin A deficiency and pigmentary degeneration of the retina, in which the rods themselves are deficient. This constitutes the condition nyctalopia, which term is, as stated, commonly confused with the term hemeralopia. Hemeralopia, from its derivation, really means dim or confused vision in daylight. This is how the term is understood by ophthalmologists, who recognize that certain persons with defective central vision due to lesions of the central part of the retina or papillomacular bundle of the optic nerve are unable to see as well as others in the daylight, while at night, when only the peripheral portion of the retina is called on to function, they see as well as

other persons. Such persons who see poorly in daylight because of central visual defects really see no better in the dark than normal persons but may believe they do and may be actually less inconvenienced in the dark than normal persons who are customarily dependent on their good central vision.

The function of dark adaptation varies considerably in so-called normal persons. Whether this variation ever amounts to a really abnormal ability to see in the dark seems never to have been satisfactorily determined. No careful investigations of this function in persons who are reputed to have abnormally acute twilight vision, such as the aviators described, has been discovered. The most likely explanation in most cases would seem to be on the basis of such careful training to detect and interpret properly visual impressions as is seen in hunters and native guides who, with only normal lenses, are able to detect the presence of animals under conditions in which the untrained observer might see the signs but would not notice them.

Because of the confusion in terms it is probably better to refer to day blindness and night blindness rather than nyctalopia or hemeralopia.

TREATMENT OF NASAL OBSTRUCTION

To the Editor:—Please advise me as to the present status of the intranasal application of estrogenic substances as used in the treatment of local nasal disturbances. A western rhinologist told me last winter that he had considerable success in combating symptoms of nasal edema and swelling with this material when the condition could not be traced to allergy. I have in mind a woman of 19 who had a thyroidectomy seven years ago on account of toxic adenoma with recurrence and reoperation six months ago. Beginning some time before the last operation she has complained of frequent "stoppage" of the nostrils during both day and night. This has not been affected by several vacations into other and distant localities, and usual methods have so far failed to give relief. Also the condition is chronic in nature. Some time ago she consulted a rhinologist, who performed a submucous resection of the septum. Since that time she has been suffering more than before. Except as noted, there is no evidence of any physical impairment.

M.D., North Carolina.

ANSWER.—From the description given, the chief complaint seems to be nasal obstruction not due to allergy nor caused by an obvious suppuration in the accessory nasal sinuses. The most likely venture as to the cause of the trouble would be that it is a tumescent rhinitis.

The diagnosis can easily be confirmed by examining the nose before and after the use of some adequate astringent. If there is a definite change after the use of such an astringent, and the mucosa is thoroughly shrunken, rational treatment would be cauterization of one type or another. Should astringents fail to shrink the mucosa of the nose, a diagnosis of chronic hypertrophic rhinitis would be reasonable. Such a condition is either localized, as would be evidenced by seeing hypertrophied posterior ends, or it would be seen throughout the length of the inferior turbinate.

Estrogenic substances used locally have not been recommended for these conditions. They have found their chief use in atrophic rhinitis, in which, in a number of instances, after a fair trial the mucosa has resumed its normal turgidity.

EXFOLIATIVE DERMATITIS

To the Editor:—A man aged 57 visited a dermatology clinic for what appeared to be a seborrheic dermatitis of the face and scalp. His head and face were treated with roentgen rays and he was given an ointment of sulfur and salicylic acid to apply on the affected area and a resorcinol shampoo for the scalp. The face was burned by the roentgen treatment and the skin began to desquamate. In about a week the lesion had spread to the chest and groins and in another week covered the entire body. There was intense itching and burning and of course abundant exfoliation, so that the diagnosis was plainly an exfoliative dermatitis. The condition has existed for two months and the patient suffers considerably from itching and burning. Treatment has been directed toward relief of these symptoms with colloidal baths and bland oils. The etiology is entirely obscure, as he had been taking no medicine and enjoyed good health prior to this affliction. Would you discuss treatment and prognosis of this disease?

John W. O'Neill, M.D., St. Charles, Mich.

ANSWER.—Exfoliative dermatitis may result from the taking of drugs by mouth or parenterally, e. g. arsenic or its compounds, or may occur as a consecutive phenomenon following local applications of an irritant nature to a preexisting dermatitis, e. g. psoriasis, lichen planus, dermatitis venenata or eczema. It may also be the precursor of one of the entities in the lymphoblastoma group (since the condition described has existed for two months); the type resulting from irritation due to external applications usually disappears in the course of a few weeks. The local treatment consists in the use of soothing applications and cessation of all local irritants or drugs that may be a contributory factor. Colloid, alkaline or bran baths are of value, together with the free anointment of the body with bland soothing salves, e. g. borated cold cream, or the general use of Pusey's calamine liniment or a simple lime water-olive oil emulsion. Intravenous injections of 10 per cent sodium thiosulfate solution is also a valuable adjunct to soothing local therapy. The general health of the patient should receive attention and the history should be carefully checked regarding the previous accidental ingestion of arsenic. If, in spite of conservative treatment, the exfoliative dermatitis persists, one must rule out the possibility of an eruption in the lymphoblastoma group, and blood examinations and microscopic examination of a gland should be done together with microscopic examination of the skin. The prognosis in the latter group of conditions is only fair.

RESULTS OF ELECTRIC SHOCK FROM X-RAY APPARATUS

To the Editor:—About eight days ago while assisting our roentgen ray technician with a patient I received a severe electric shock which knocked me unconscious to the floor. I was wearing my head mirror at the time and was standing near the patient. It is possible that my head mirror touched the wiring (we have an old Kelly-Koett which is not shockproof), since the current burned a deep hole in my head just over my right eye and singed the rest of my forehead. I regained consciousness within a few seconds but remained dazed for about two hours. Since this accident I have suffered with a headache which encircles my whole head but is more severe over my right eye. Medications do not relieve it. I have continued to work (eye, ear, nose and throat) but the headache continues and I am miserable. My sinuses and eyegrounds were checked and found to be all right. I might mention that the technician received a lesser shock while the patient received none. 1. Can you tell me what is causing the headache? Is it edema? 2. How long will it continue and what should be taken if anything for relief? 3. Are there chances of cataracts developing? If so, when do they appear? 4. Will there be any permanent damage to the brain manifesting itself later? I would appreciate any help that you can give and any references that you may wish me to consult on the subject. We were using a 30 milliampere tube and taking a picture of the lower jaw for a possible calculus in the submaxillary duct.

Michael T. Paton, M.D., Roanoke, Va.

ANSWER.—1. Edema of the brain is an infrequent complication. The usual results of severe electric shocks involving the head result in loosening of the glia and vacuolation of the nerve cells with a slight destruction of the Nissl bodies. The media of the capillaries and the blood vessels might be slightly involved. These are probably the results of increased temperature incidental to an electric shock. These end results might be the cause of the headache and, as an additional cause, the destruction of the soft tissues above the eye may be partly responsible with transmission of sensations to the peripheral nerves. These changes are not dangerous and will subside on healing of the external wound and the recuperation of the neuroglia and vacuolation of the cells, the latter taking an approximate period of three weeks to several months.

2. This question is partly answered under 1. No additional therapeutic measures are necessary, excepting the customary treatment of any superficial wound.

3. The development of cataracts is a rare incident. If it is going to occur it usually happens within the first three weeks.

4. This was partly answered under 1. However, in amplification, it can be anticipated that no permanent damage to the brain will occur.

An interesting article written by R. H. Jaffe, M.D., entitled "Electropathology," was printed in the *Archives of Pathology* (5:837 [May] 1928).

PROSTATIC HYPERPLASIA AND URETHRAL DILATORS

To the Editor:—Please give me an opinion on the "oscillatherm" for prostatic work. This is manufactured by the Oscillatherm Company, 333 West Second Street, Los Angeles. What do you think of prostatic therapy by this means and also what are the best appliances used? Please give me a list of good urethral dilating instruments. What is thought about the compound dilator, i. e. the type that has an adjustable screw to cause the formation of any size dilator? In my practice I have occasion to use dilating instruments to overcome strictures. I also have a good many patients with benign prostatic hypertrophy and would like to know if an instrument of the oscillatherm type has any merit.

A. E. Sprafka, M.D., Detroit Lakes, Minn.

ANSWER.—There are many instruments on the market which are supposed to apply heat to the prostate gland and which are of doubtful therapeutic value. The best method of applying heat is by means of diathermy. Neither diathermy nor any other method of applying heat to the prostate gland is of much value in the treatment of prostatic hyperplasia and urinary obstruction. It may, however, be of some value in the treatment of prostatitis when used with prostatic massage. In some cases prostatic hyperplasia can be reduced by the use of androgen, but the degree of urinary obstruction is seldom completely or permanently diminished. Prostatic obstruction which causes

retention of urine is treated best by means of transurethral resection in the hands of a urologist who has had extensive experience and who is skilled in its use. If this procedure is not available, either perineal or suprapubic prostatectomy should be employed.

Graduated Van Buren sounds are excellent instruments for the purpose of dilating the urethra, although the Kollmann dilator with rubber covering is preferred by many urologists.

ATYPICAL MÉNIÈRE SYNDROME OR CEREBELLOPONTILE ANGLE TUMOR

To the Editor:—A white man aged 48 has been suffering from trigeminal neuralgia since 1932. The pain did not respond to the usual remedies and in 1934 he had his first alcohol injection with prompt relief. Since that time he has had repeated alcohol injections every eight to ten months with complete cessation of pain. About April 1939 he began to complain of a reeling sensation, a feeling as if he was going to fall down. This feeling is so strong that he has to grasp a stationary object or else sit down. This sensation lasts a few minutes and is not accompanied by nausea, vomiting, tinnitus or deafness. There is also no nystagmus. These attacks come on frequently during the day and occur also at night when the patient is lying in bed. He has had repeated lumbar punctures and encephalograms with no abnormality noted. He has no carious teeth, infected tonsils or sinusitis. The blood pressure is 124 systolic, 86 diastolic. Blood counts and smears were within normal limits. His present weight is 168 pounds (76 Kg.) and has been the same for several years. Since March 15 he has been on a high vitamin low carbohydrate diet, with 50 mg. of nicotinic acid five times daily and 20 mg. of thiamine hydrochloride and 7½ U. S. P. units of liver extract intramuscularly every other day. His pain, which began to recur about the time this treatment was started, has gradually subsided but there has been no improvement in the vertigo. He can induce a paroxysm of pain by rubbing his forehead or cheek. The Wassermann reaction is negative. There is no evidence of arteriosclerosis. The lesion is on the right and apparently involves all the branches of the nerve. Because of the attacks of giddiness he is unable to do a day's work. Would you say that almost five months of continuous vitamin therapy a fair test? Could this be a reflex spasm of the vestibular portion of the auditory nerve? Would section of the sensory fibers of the fifth nerve help his reeling sensation?

M.D., Rhode Island.

Answer.—A cerebellopontile angle tumor is suggested by this unusual history, but it would seem to be ruled out by the absence of tinnitus, deafness, nystagmus and the normal spinal fluid. Angle tumors usually produce an increased pressure, almost always an increased protein in the spinal fluid. Caloric tests and audiometer readings would be worth doing, as an additional safeguard.

The other alternative would seem to be an atypical Ménière's syndrome, though the absence of nausea and nystagmus during the attacks is unusual. The use of the Furstenberg diet or large amounts of potassium chloride would be worth a trial. These measures have been described in the following publications:

Talbott, J. H., and Brown, Madelaine R.: Ménière's Syndrome: Acid-Base Constituents of the Blood; Treatment with Potassium Chloride, The Journal, Jan. 13, 1940, p. 125.

Brown, Madelaine R.: The Medical Treatment of Ménière's Syndrome, *ibid.*, April 3, 1937, p. 1158.

Any vitamin lack would certainly be made up by the treatment which has been given. Section of the root of the fifth nerve could scarcely be expected to relieve the dizziness.

TEST OF LABOR AFTER CESAREAN SECTION

To the Editor:—The wife of a doctor, born in 1912 and married about a year, aborted at about the third month in December 1939. At the time a diagnosis of uterine incarceration was made. In March 1940 the uterus was freed under anesthesia. The patient menstruated the last time perfectly normally on April 17. Her progress was uneventful. The due date was calculated as Jan. 24, 1941. Fetal movements were first felt on August 13, which corresponded to the menstrual date. At twenty-seven and one-half weeks a silent hemorrhage occurred. A diagnosis of placenta praevia was made and confirmed by roentgen examination. A Latzo cesarean section was decided on. The peritoneum was torn at the uterine reflection, so that plan was abandoned and the uterus incised vertically partly through the uterine peritoneum and partly extraperitoneally. The closure was made in four layers, first, muscle and mucous; second, muscle; third, serous and muscle, and, fourth, serous, with a Connell suture. The only knot in evidence at the finish was extraperitoneal. The usual abdominal closure was done. In a subsequent pregnancy would a test of labor be unduly hazardous?

M.D., Texas.

Answer.—"Once a cesarean always a cesarean" is a rule to which many believe there should be numerous exceptions. Many leading authorities would consider it not at all hazardous to permit a test of labor in this case provided the patient made a normal convalescence after her operation.

This is an opportune time to emphasize that suturing the uterus with one or two layers of sutures is preferable to closure with four layers; the mucosa-muscle suture might well be dispensed with.

TESTS FOR COLOR VISION

To the Editor:—When did the Ishihara test for color blindness come into use and for what purpose?

A. W. Ide, M.D., St. Paul.

Answer.—The Ishihara charts consist of pseudo-isochromatic diagrams of numbers or letters marked out in colored spots on a background of similar colored spots. They are a variation of the tables devised by Stilling in 1883. The Ishihara charts were first published in 1925, and are probably the ones in most general use. They are used as a test for color blindness but are too selective. The Medical Corps of the U. S. Army now uses the Holmgren yarn test devised in 1877 to test railroad employees in Sweden and the pseudo-isochromatic plates of the American Optical Company. The most accurate of all tests for color blindness is with the instrument (anomaloscope) devised by Nagel in 1907. This makes use of the matching of prismatic colors observed through a tube and has never been in universal use because of the expense of the instrument.

FISTULA IN ANO AND TRAUMA

To the Editor:—A white man aged 36 noted discomfort in the perineum after using an "exercycle." This disappeared in a few hours. Five days later he arose with pain about the anus. Examination at this time with a Humphrey speculum revealed an opening in the anus discharging pus. Incision revealed that the fistula led to a cavity extending almost to the urethra. I believe the abscess originated in a Cowper's gland which extended to the perineal region and ended in a fistula in ano. Is it reasonable to assume that this process began from trauma and reached the result found at operation within five or six days?

D. J. Stewart, M.D., Pittsburgh.

Answer.—In view of the fact that blind fistulas develop with pus discharging into the anus without the use of external trauma such as might be obtained from pumping a bicycle as this patient did, and that most of these infections of the type described are the result of trauma due to passage of particulate matter through the anus, it is difficult to say that the fistula developed from the exercise on the bicycle. It might not be impossible but is unlikely.

CALCIUM CARBONATE AND FECALITH FORMATION

To the Editor:—A patient takes three or four tablets containing calcium carbonate after each meal and often repeats the dose. It seems to me that I have seen somewhere that fecaliths could result from a continued use of calcium carbonate. Is this true?

M.D., Alabama.

Answer.—The continued use of calcium carbonate in doses larger than 0.65 Gm. (10 grains) may produce fecaliths. This does not happen with the majority of patients, even when larger doses are taken several times a day. If there is any tendency to constipation, this could be prevented by taking a small dose of liquid petrolatum at bedtime.

LOCAL ANESTHETICS IN OIL

To the Editor:—Is there any objection to the use of a local anesthetic in oil in the sacro-iliac ligaments and lower lumbar muscles for acute pain following low back strain?

M.D., Ohio.

Answer.—The use of a local anesthetic in some kinds of oil has been satisfactory, but occasionally an untoward result directly due to the kind of oil used may develop; e. g., peanut oil has been reported as having resulted in dermatitis and some other oils have been associated with sloughing.

PILONIDAL CYSTS AND CANCER

To the Editor:—Please give me information as to pilonidal cysts and remnants becoming malignant.

E. V. Andrew, M.D., Maquoketa, Iowa.

Answer.—While it is quite possible for any cyst lined with squamous epithelium to become malignant, in a large experience with such cysts they have never been seen to become malignant even though recurrence of the cyst has been noted several times. No report in the literature of cancer developing in a pilonidal cyst has been found.

PYONEPHROSIS AND NEPHRECTOMY

To the Editor:—Is nephrectomy necessary in most cases of severe unilateral pyonephrosis? Would the presence of renal calculi influence this decision? In the case I am interested in the opposite kidney is apparently normal.

O. C. Amstutz, M.D., Bellefontaine, Ohio.

Answer.—Nephrectomy is necessary in most cases of severe unilateral pyonephrosis. The presence of stones serves as another specific indication to perform a nephrectomy.